A longitudinal study of the personality and the attainments and attitudes of junior school children.

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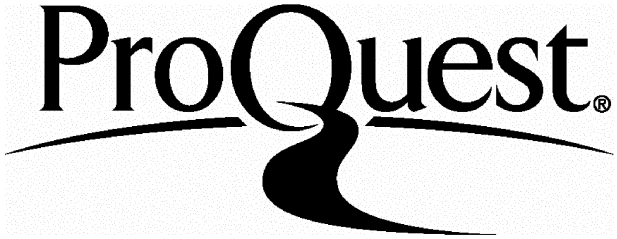

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Derek Sharples 1971.

For

Brenda

who waited

Labour is blossoming or dancing where
The body is not bruised to pleasure soul,
Nor beauty born out of its own despair
Nor blear-eyed wisdom out of the midnight oil.

W.B. Yeats

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A List of Contents.

Chapter One.

Summary.

Extraversion and stability have been associated with higher attainment up to age 13, when a 'crossover' to superiority of neurotic introverts occurs. If this effect arises from differential rates of attainment amongst personality types this will be detected through longitudinal rather than cross-sectional studies. If schooling is related to the personality v attainment interaction then this will be evidenced in data from particular schools but will be submerged in large samples.

234 children in five schools completed tests of personality, attainments and attitudes at 8+, 9+ and 10+. Results were examined by analyses of variance and co-variance, considering sex and three levels of each of extraversion and neuroticism.

Personality scores were unstable, but this was not related to attainment levels. Interactions of attainment and extraversion were consistently linear and in favour of extraverts, being greatest during the 9+ to 10+ year. No clear trends emerged in relation to neuroticism. Results within schools showed different patterns, in one school extraversion was closely related to success, in another no association emerged. There was no evidence of different patterns of association for different attainment areas, schooling appearing to favour stable extraverts irrespective of subject and this trend being stronger in a 'traditional' school.

Slight evidence indicates a more rapid gain in attainment amongst extraverts at 9+, and at 10+ slight changes in trend of association may pressage the 'crossover'.

No consistent patterns of association were found between attitudes and personality, there was a suggestion that introverts held more

favourable attitudes in some areas.

Findings are limited by restriction of the sample, the range and stability of the tests and the approximations within the analyses. Follow-up studies, larger-scale replications and analyses of school effects are required.

Chapter 2.

Pertinent Literature.

2.1 The study of personality.

The field of personality study and its relationship with attainment has expanded rapidly since Thomson's (1946) suggestion that insights were too limited to permit a detailed analysis, and the emergence of the work of Cattell and Eysenck has countered Thompson's claim that the area lacked a leading protagonist. In a review of research published during the twenty years following Thompson's paper Burt (1965) was able to make broad generalizations based on a large number of theoretical and empirical studies. He suggested that whilst the personality of each individual may be unique there emerge recognizable general structures of motivational tendencies, one of these is identified as emotionality, another as extraversion v introversion. Burt would also add euphoria v disphoria, and expressed dissatisfaction with the nomenclature of the dimensions as he felt these to be associated with abnormal conditions rather than with the normal range of characteristics to which they are applied. Burt considered personality, defined as "the distinctive way in which any given individual's non-cognitive or dynamic tendencies are organised", to be of far reaching influence on the educational progress of pupils and students and suggested that longitudinal studies be set in hand to identify the nature of the relationships between personality and attainment. Whilst this field has been extensively researched in the six years since Burt's paper many insights have only recently emerged and numerous gaps remain in the evidence. The present study attempts to explore one of the neglected areas of research in this

area, utilizing a longitudinal design and taking into account current theory and evidence.

2.11 Personality definitions.

Personality has proved an elusive concept for the educator and psychologist. Burt (1945) defines it variously as the goals towards which an individual is striving, the energy with which those goals are pursued and the efficiency of the mental mechanisms directing that energy. Stress is laid on the dynamic characteristics of the concept, in that it is identified in relation to the environment (Mabberley. 1946) and that it is essentially a complex and interactive concept. Allport (1946) points out that the study of such a concept is essentially one of variety and must embrace both nomothetic and idiographic approaches, using clinical and experimental techniques to resolve the problem of disentangling the complex of hereditary, physical, maturational and environmental factors involved. This view is shared by Burt (1947), who together with Allport favours the search for traits of personality which might serve as co-ordinates of the concept, rather than research into isolated and specific responses.

From these early theoretical propositions a wholistic view of personality as characteristic modes of interaction with the environment and disposition towards it emerges, together with the opinion that studies of the problem should focus on general traits without losing sight of the essential idiographic and dynamic aspects of the issue. Thus Eysenck (1953) defines personality as "the more or less stable and enduring organization of a person's character, temperament, intellect and physique, which determines his unique adjustment to the environment". 'Character' is defined as the more or less stable

system of conative behaviour, temperament, that of affective behaviour, intellect, of cognitive behaviour. (p.2 op cit.) Eysenck (1947), as discussed below, subscribes to the hierarchical view of personality structure commonly favoured in much contemporary research and his scheme of personality organization further clarifies the terms employed in discussions of personality. These are summarised in figure 2.1 below, in the present study the terms type, trait and response are used in the sense given there. "Types" as a concept is greater in inclusiveness than "traits" and is expressed in terms of polarities of particular continuae, e.g. Introversion v Extraversion ; Neuroticism v Stability. Traits are similarly expressed but are clearly less general e.g. subjectivity - objectivity, conformity - unconformity.

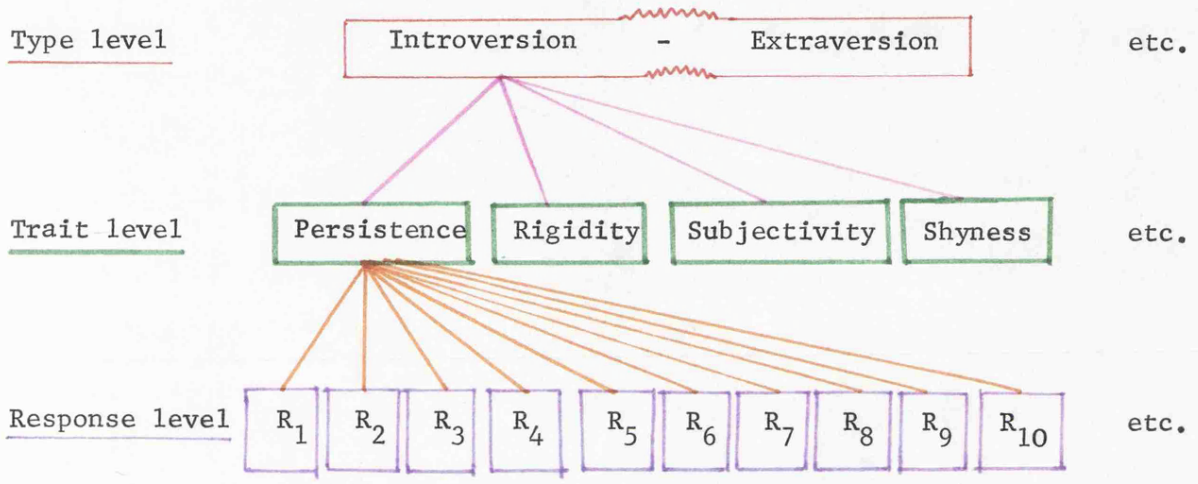
2.12 Personality traits and dimensions.

Burt himself in an early paper (Burt.1915) analysed data from descriptions of children aged 9-11 and identified two major personality types of action v inaction, and euphoria v dysphoria. These were seen to be related to Galen's typology of sanguine (active and euphoric), choleric (active and dysphoric), phlegmatic (euphoric and inactive) and melancholic (dysphoric and inactive) characteristics. Subsequently the Euphoria-Dysphoria type dimension was considered to parallel Jung's Extrovert - Introvert, or as Burt prefers dysthenic - asthenic distinction, and the active - inactive dimension was resolved in terms of 'emotional reactivity'.

These early approaches and theories are mirrored in the work of Cattell and Eysenck who have dominated the field of research in this area since the 1940's. Their approaches, whilst related, are best

Figure 2.1

Hierarchical structure of personality organisation. (after Eysenck, 1953)



Note: Eysenck differentiates between 'Habitual' response levels and the 'Specific' response levels of particular behaviour in a unique situation.

considered separately in order to identify their characteristic contributions.

Identifying abilities as the 'simplest manifestation' of personality functioning Cattell (1946.a) deplored the lack of clarity in the field of more complex analysis of those habits and fundamental traits of which abilities are but the tools. He suggested that the emphasis on attainment measurement in education was mistaking the classroom for the world, and that a broad conception of personality was required, within which rigorous analysis should be conducted to identify major dimensions. Subsequently Cattell conducted an immense analysis of character descriptions in order to define the language of the concept, these labels were then applied to diverse groups of individuals and the results subjected to factor analysis. In a search for communalities of characteristics, using simple structure as a criterion, Cattell isolated fifteen traits (or 'factors' in his terminology) in addition to intelligence, and these have been the basis for a series of personality tests and investigations. Further analysis of the fifteen traits identified major, or second order clusters of traits conforming to personality types which would substantially account for the variances amongst the test items in terms of two dimensions. These were labelled ~~extraversion~~ "exvrsion" and "anxiety." (Cattell.1946,1965)

Eysenck's approach is characterised by its clinical foundation and rather different use of factor analysis. Examination of ratings of 7,000 patients (Eysenck.1947.b) by correlation and factor analysis was carried out with the intention of identifying factors which would account for the greatest variance amongst the wide variety of characteristics concerned, employing centroid criteria. As in

Cattell's work two factors emerged as accounting for a considerable amount of the variance and these were identified as the personality types of Neuroticism and Hysteria, the latter being renamed as 'Extraversion' in relation to normal subjects. (Eysenck.1952)

Thus two different approaches have produced similar models, but important differences of interpretation and technique remain. In technique Cattell employs factor analysis as a method of identifying dimensions amongst normal subjects, searching for a large number of reasonably well loaded factors; Eysenck on the other hand employed factor analysis as a tool in an examination of clinical characteristics for evidence of a small number of heavily loaded orthogonal factors. That both methods should lead to models closely similar to those of Galen and Burt discussed above is striking, but distinctions and expansions of factors so far identified are essential if the concepts are to be linked meaningfully with personality analysis in given situations. A discussion of personality types evidenced by Cattell and Eysenck follows below.

2.13 Extraversion.

Kay (1960) has summarised extraversion in terms of reaction to the outside world, describing the extraverted individual as one whose behaviour and thinking are governed with reference to his environment. Whereas the introvert is aloof, the extravert is warm and sociable, 'thick-skinned' and outwardly confident, 'happy-go-lucky' in attitude and talkative in contrast to the introvert's more restrained and inward looking nature.

Oliver (1930) developed the concept from the classical formulation of Jung and in a study of 181 adults identified 40 individuals who

could be classified as either extravert or introvert rather than 'ambivert' which Cronklin (1923) suggests is the 'normal' type. Amongst the 40 cases studied by Oliver extraversion appeared to be slightly related to intelligence but introversion with scholarship. Oliver suggested that the results indicated that temperament must contribute substantially to the superior scholarship of introverts. Eysenck's (1947) formulation is similar to that given above, but later studies (Eysenck.1957.a) amongst wider ranges of subjects than the earlier work gave rise to more specific definitions. Personality types and constructs are conceived as 'constitutionally determined' properties of the central and autonomic nervous systems determining reaction properties such as the speed of conditioning and the strength of reaction in terms of both sociability and impulsiveness. The former, it is suggested, is most affected by environment whilst impulsiveness is more influenced by heredity. In terms of reactivity the extravert is seen to generate reactive inhibition quickly and to dissipate it slowly, thus reacting negatively to tasks of greater difficulty. On the other hand introverts, with slow build up of inhibition and quick dissipation, demonstrate persistent behaviour in difficult task situations, similar to that associated with high 'autonomic drive'.

The association between these behaviour patterns and clinical conditions are further described by the same author (Eysenck.1957.b.), who suggests that hysterical conditions are associated with extraversion and dysthenic problems with introversion. The dimension is thus linked theoretically with a wide range of clinical, problem solving and educational problems.

It will be seen from the above summary that extraversion is linked

with a number of behaviour traits, sociability, effectiveness in interpersonal relations, impulsiveness and ego-strength. Eysenck and Eysenck (1963) explored responses from 300 adults in order to test the unidimensionality of so diffuse a concept and concluded that impulsiveness and sociability are consistently associated, and that whilst having slightly different loadings on neuroticism they are nevertheless sufficiently close to be treated as an identity. Carrigan (1960) reviewed thirty two factorial studies of personality and noted that a dimension closely similar to Eysenck's extraversion consistently emerged, however it appeared important to note carefully differences in definition, and to bear these in mind whilst examining evidence employing typological definitions. Cross-cultural studies between Canadian and English secondary school children do not indicate that the types defined by Eysenck are specific to a particular cultural milieu, (Costello and Brachman.1967), and in general the type concept has been assumed to be identical in both English and American studies, although there is some slight evidence of differences between pupils of secondary age. Possible cultural differences are important in this area as the principal workers have tended to concentrate their work on subjects in either the U.K., in the case of Eysenck, or the U.S.A., in the case of Cattell.

Cattell's approach facilitates a more detailed analysis of extravert traits but the second order factor type emerges consistently in his work. Cross-cultural studies (Cattell and Warburton.1961) indicate that there may be cultural differences in the concept, extraverted American University students in their study being less dominant and more adventurous, but less easily differentiated by bohemianism. In absolute terms the British students scored more highly on the

introversion, sensitivity and radicalism scales. Nevertheless the contrast between the extremes of the type scales is evidenced in all these studies, and it appears that in Cattell's scheme it is possible to retain 'Extraversion' as a concept close to that of Eysenck (Eysenck.1964).

2.14 Neuroticism and anxiety.

Kay describes the anxious child as intense, serious, easily upset and moody when corrected. Confronted with new problems he will show stress and will be timid at games, whilst the stable child will be tough, placid, unaffected by new situations, and stolid in general approach and social relationships.

Some differences of definition emerge with respect to this type as with extraversion. Eysenck (1947) identifies it as one of neuroticism polarised with stability, recognising that in his studies neurotic patients were characterised by one end of the dimension. Cattell (1963,1965) however polarises stability with anxiety, the condition typifying normal individuals at the end of the dimension in his investigations. Burt (1965) questioned the use of the term 'neuroticism' as applied to normal individuals, and Adcock (1965) suggests that the concept of emotional reactivity might be an appropriate one to embrace the patterns associated with neuroticism and anxiety dimensions in personality studies of non-clinical subjects. Lynn (1970) is sweeping in describing a "trait (type) called anxiety by Cattell and neuroticism by Eysenck", for whilst the general factor type does emerge in both schemes, and might be appropriately re-named as Adcock suggests, it is important to recognise the distinction between the concept in studies employing one or other of the two

formulations. As with extraversion Cattell attempts a more detailed analysis, for him anxiety is characterised as fear triggered by cues, as a drive to action, and, in stress conditions, as a disorganising feature associated with neurosis. It is in this last sense, which Cattell calls regression (Cattell.1963), that his formulations of the type comes closest to that of Eysenck for whom neuroticism is a structure similar to Cattell's but more heavily loaded with neurotic characteristics. (Eysenck.1964,1965). Such distinctions can be seen to have roots in the techniques and procedures of these two workers, as summarised above. Frost (1968) has attempted to resolve the differences, examples of what Allport (1963) has described as the 'rag-bag of trait names', by reference to studies of children in whom anxiety is seen to refer to the likelihood of being threatened by the external world and by a specific way of responding to such a threat.

To summarise the position regarding personality constructs we can turn to Eysenck and Rachman (1965) who state "Individual organisms differ innately with respect to many variables which may determine their responses to certain classes of stimuli.", and, " .. there are two main factors which between them account for a good part of the non-cognitive aspect of personality ..". The present study is concerned with these two factors, which throughout are referred to simply as the personality types of neuroticism and extraversion, and the relationships of these dimensions with certain aspects of children's schooling.

2.15 Neuroticism and Extraversion in children.

The classical formulations described above have been substantially supported by evidence from empirical work amongst children. Examples of such support are found in Digman (1963) who analysed ratings of 102

children aged 6+ and reported a complex structure which could be approximated by a two factor model labelled 'success' versus 'unsuccess', and 'introversion' versus 'extraversion', although he suggests a two factor model oversimplifies the data. Black (1965) in a study of a wide age range from six to thirteen examined 700 children rated on 51 traits by teachers and trained observers. Adjustment and extraversion appeared as two factors which accounted for the greatest amount of variance. A similar study of constructs of children's personality ratings is reported by Morrison et.al. (1965), amongst 11-12 year olds they identify three dimensions, one an intelligence and attainment factor, one associated with sociability and extraversion, the third, including such traits as carefulness, attentiveness, quiet, trustworthyness, cooperativeness, is probably a neuroticism/anxiety dimension as reflected through behaviour in school. Eysenck and Pickup (1968) make the point that teachers have less evidence to rate neuroticism, a covert and internally felt response, than extraversion, an overt social response. In their study of 284 secondary school children they show that teacher ratings are closer to those of standard personality test scores in respect of extraversion than in neuroticism, and note that there is a correlation between introversion and neuroticism in teacher ratings. They suggest that this may be accounted for by teachers interpreting neuroticism (withdrawing, quiet, non-disruptive) as stability, and by teachers responding more positively to the social evidence of extraverts than the more subtle evidences of introversion and neuroticism, which are consequently confused.

This proposition would account for the contamination of teacher ratings by schooling factors; Yates and Pidgeon (1957) observe that traits considered by teachers to be 'good' characteristics are

associated with high attainment (r=.6) and that persistence, sociability and self confidence are the most frequently employed rating dimensions. Hallworth's (1965) study of secondary modern boys shows similar trends, with a stability factor accounting for 28% and extraversion 19% of variance, with a 'masculinity' dimension also emerging. An earlier study (Hallworth and Morrison.1964) reported similar findings, with 'good pupil' and 'non-academic leadership' emerging alongside the two principal dimensions recognised as extraversion and neuroticism. Hallworth (1964) suggests that evidence from a study of personality ratings by Comprehensive school housemasters indicates not only the personality organization of the pupils, in terms of extraversion, intelligence and reliability, but also the modes by which teachers organise their perceptions of children. Extraversion is typified by a sense of humour, sociability, cheerfulness, spontaneity, self assertion, confidence and popularity; reliability and stability by cooperation, trustworthiness, persistence, emotional stability. Thus the two major personality types are identified consistently in studies of pupils at all ages, but take on something of the character of the context within which the ratings and measures are made.

It is to be expected that ratings of children in school should emerge in the way described above. Allport (1963) points out that personality can only be viewed in a context, "If there is no personality without situation, it is equally true that there is no situation without personality. The pull of personality is so powerful that we are forced to regard personality as never a fixed entity or pattern but a complex system of potential ranges of behaviour that may be evoked by the various physical, social and cultural conditions.". (op.cit.p.181). In the school situation personality ratings are

inevitably based on behaviour responding to school situations and the strength with which the two dimensional structure emerges in so specific a context is a powerful evidence of its form. However other dimensions have emerged in studies of school children, often with specific relation to the school situation.

2.16 Other personality dimensions in school children: achievement motive

In a wide ranging review of personality assessments Vernon (1953) supports the general structures proposed by Eysenck and Cattell, but prefers to call the neuroticism dimension "dependability", a concept close to 'stability' and to 'perseverance'. This latter dimension emerged as a significant non-cognitive factor in Spearman and Jones' (1950) analysis of human abilities, in which perseverance is the name given to the characteristic drive or inclination to employ and apply cognitive abilities. A closely associated characteristic which emerges from many studies of school children is that of achievement motivation (McClelland.et.al.1953). This characteristic has been described by Mukherjee (1969) as including autonomy, persistence, perception of performance levels, low dependence on ego ideals, security, stability, sensitivity to intrinsic motivation and future time orientation. Here again a single generic name is employed to represent a diverse group of trait elements, giving the concept the appearance of a personality 'type' dimension. A factor analysis of high school children's scores on a Personal Values Inventory (Finger & Schlesser 1965) indicates that achievement motivation is concerned with both attitudes towards school and levels of aspiration. Entwistle (1968) describes achievement motivation as determination to succeed in academic studies and reports the construction of a scale for its measurement. Results from this test amongst 13 year old

children indicated that the scores have closer relationships with attainment than intelligence, as would be predicted, and independence from social class, which supports Swift's (1966) suggestion that variability of aspiration and environment within social class levels is greater than that associated with differences between groups defined in socio-economic terms. Entwistle suggests that the achievement motive is probably best conceived in terms of both temperamental traits and environmental variables, obviously the school will figure largely amongst these latter as an agency especially geared to the values described by Mukherjee. What emerges from studies of achievement and attainment motivation appears then to be a construct emerging from the function of personality types in particular circumstances, rather than an additional type. Whilst the items identified by Entwistle (1968) as discriminating academic motivation show close relationships with those of anxiety concerning school work identified by Barker Lunn (1969), details of the relationship of the achievement motive concept to the major personality types remain unclear. Lynn (1969) in a study of the achievement motive in adults reports correlations of -.003 with extraversion and +.097 with neuroticism, suggesting that the construct is independent of the two major personality types. However Eysenck (1967) has associated introversion with achievement orientation in contrast to extraversion being associated with affiliation orientation. In a study of a group of 13 year old children Nisbet (1968) shows the construct as measured by Entwistle's (1968) instrument to be related to improvement and deterioration in academic performance, and also to be related to the 'good pupil' image of intelligent, higher social class girls. In a study of 383 Junior age children Bruchman (1966) produces evidence showing similar trends

to Nisbet's results, girls, older and more mature pupils being highest in achievement motivation as measured by McClelland's test. Theoretical explorations of the field (Crandall et.al.1960) suggest that achievement has close relationships with the academic context, goals and standards of the individual, and that aspirations are associated with success and failure. (Barker.1942). Sontog and Kogan (1967) in a review of 71 case histories found that achievement motivation emerges during the period of junior schooling, and is subsequently associated with adult intellectual success.

It would appear that whilst the concept cannot be defined as a personality type, it is one which must be returned to in a discussion of personality in relation to educational situations and issues.

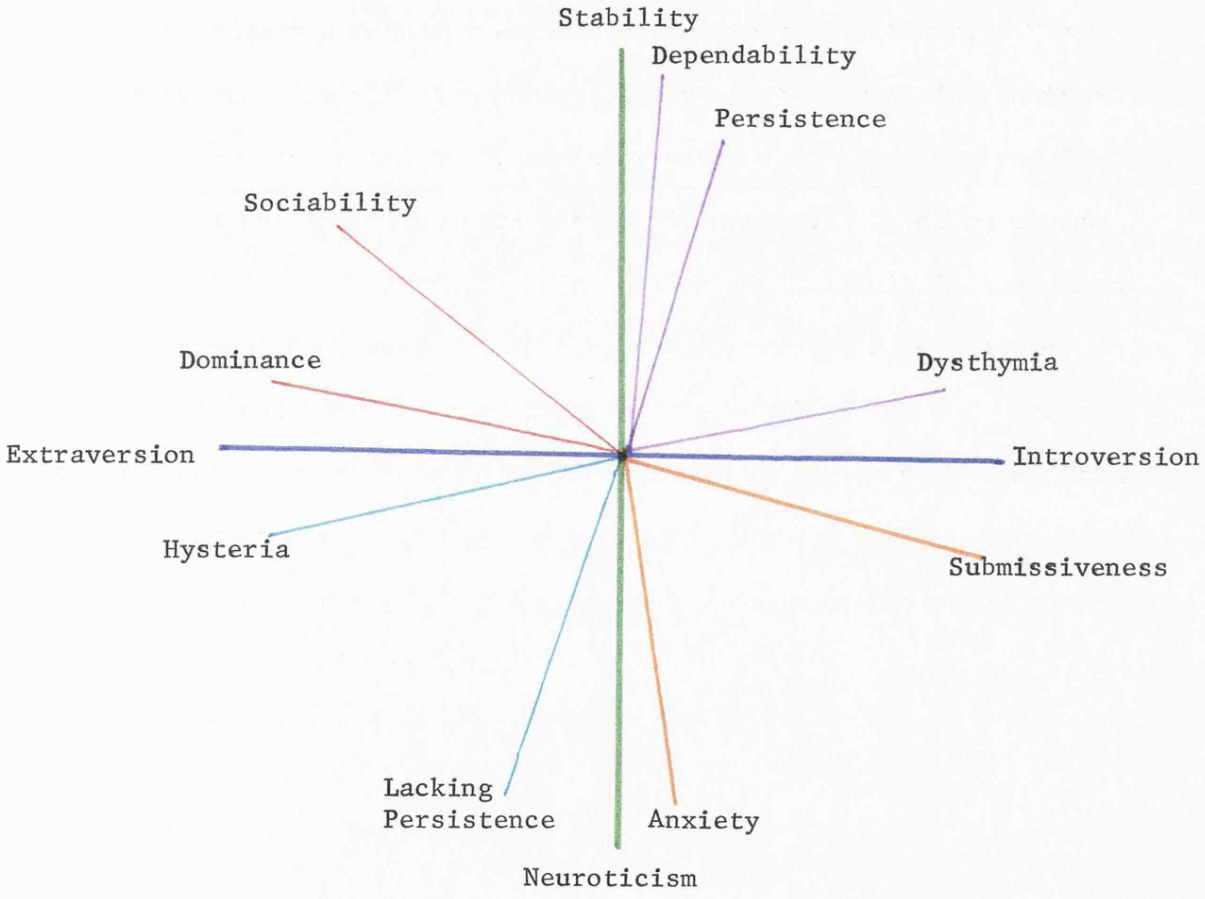
2.17 Other dimensions in school children : test anxiety

In the discussion of anxiety above, Cattell's (1963) view of anxiety as a disorganiser was referred to, a number of studies have considered anxiety in relation to academic stress in learning situations. The point has been made that anxiety is triggered by environmental cues and schooling situations are sources of many such cues; assessments, test completions, new areas of study, unfamiliar concepts, problem situations in learning and so on. It has been theorised that such situations may increase anxiety amongst children, and attempts have been made to develop scales to measure anxiety in such situations (Castaneda etc. 1956, Taylor.1953). These scales focus on symptoms of excitability and high tension manifested in specific situations. Sarason et.al. (1960) suggest that anticipatory failure stimulates anxiety responses regardless of its realism, and that where failure is perceived anxiety is aroused so as to interfere with subsequent

performance and further aggravate cues for anxiety. Anxiety increase is accompanied by increasingly low intelligence scores, and anxiety decrease by improved scores, (Sarason et.al.1964). Studies of specific stress situations have not been especially promising, Sarnoff et.al.(1959) in a study of the 11-plus examination report a correlation of -.068 between anxiety test scores and results of the examination. A cross cultural study (Sarnoff et.al.1958) indicates similarly low correlations but lays stress on the interaction of anxiety with particular stress conditions - in this case test situations. These results are in line with the general theory that neuroticism/anxiety is a major temperamental type, and that personality is conceived in terms of interaction with particular environments. In other words 'test anxiety' would appear to be a particular trait within the general type of neuroticism, and, whilst the relationship of schooling to temperament must be considered in a study of achievement and personality, it would not be reasonable to consider test anxiety as a type additional to the major dimensions.

Relationships amongst the personality concepts discussed above are summarised in figure 2.2.

Figure 2.2 Diagram of Relationships between Main Personality Types. (After Eysenck. 1953)



Chapter 2.

Pertinent Literature.

2.2 Personality and achievement.

The evidence reviewed to this point indicates the existence of two personality types which can be seen to account for a considerable proportion of variance amongst non-cognitive human characteristics, and shows that these can be identified amongst children in relation to schooling situations. Of particular interest to educators is the question of the extent to which these insights account for observed differences in achievement, contribute to the differential behaviour of children in school, or inform teachers as to appropriate strategies to adopt in the face of particular temperaments. Burt (1965) saw a number of additional problems in this area, including the question of the determination of temperament by environment or heredity, the role of personality study in the prediction of delinquency and the analysis of associative and causal relationships between attainment and personality. He comments, "There can be little question that the basic qualities of a child's temperament and character have a far reaching influence on his educational progress (as a pupil)" (op.cit.p.374.), reiterating his earlier statement that a common cause of failure lies in character (Burt.1947), a view supported by Alexander (1947). Lavin (1965) in a review of some aspects of the problem suggests that social maturity is related to good study habits and attitudes, stability to low test anxiety, introversion to low impulsiveness and independence in achievement, all suggesting relationships between temperamental traits and school performance.

A number of studies have considered the nature of the relationships

between achievement and personality, these have reported evidence from all age ranges and the present summary groups together studies dealing with age groups equivalent to the Primary, Secondary and Tertiary levels of English education.

2.21 Personality and achievement : evidence from Primary age pupils

There have been few studies of younger primary children in this area. Sontag et.al.(1958) and Kagan et.al.(1958) examined the hypothesis that personality affects IQ change, suggesting that high motivation and conformity produces a drive for high achievement. They further suggest that competitive school situations may favour children who are active and who show curiosity. They tested a sample of 70 boys and 70 girls annually from 2.5 to 12.0 years, obtaining Stanford Binet IQ, Rorschach and T.A.T. responses at each age level. Scores were obtained for achievement motive, aggression, curiosity and activity, the trends of the upper and lower quartiles in terms of IQ being compared. Results indicated an association of achievement, as predicted, with achievement imagery, curiosity themes and low passivity, probably the personality aspects most closely associated with the acquisition of skills measured by the Stanford Binet. The sample here was very restricted in size and was biased towards higher intelligence (Mean IQ = 120), however the results can be interpreted as tending to support the view that extraversion (activity, curiosity) and mild neuroticism (achievement drive) are associated with achievement in terms of IQ at this stage. An earlier study (Sontag et.al. 1955) gave results from a larger sample of 300 in a similar test programme, here it was noted that regression to the mean, practice effects and artefacts of the test norms could each contribute to the emerging developmental patterns. However the evidence indicated idiosyncratic

maturational trends and little evidence of a general tendency. Neuroticism it was suggested could reach debilitating levels, on the other hand concern for achievement in day to day life and school situations may be associated with a striving for 'comfort' and 'adjustment', rather than an anxiety trait of interfering intensity. Motivation was thus seen to be a complex function of anxiety involving a drive for reassurance and approval, some children finding the school arena a congenial context for this and hence finding satisfaction and a decrease in anxiety. Pre-pubertal girls showed a decline in IQ, perhaps associated with the "flight into femininity". In these three longitudinal studies of attainments, in terms of verbal comprehension, reasoning ability and number skills, higher levels of achievement are associated with self assertion and a drive to mastery (extraversion and mild anxiety?), and are negatively related to passivity shown by reduced achievement motivation amongst young females.

A more highly structured and experimental study by Grimes and Allinsmith (1961) compared the reading attainment of 72 seven year old children in a 'structured' learning situation (phonic reading instruction) with that of 156 seven year old children in an unstructured (whole word method) situation. Classroom climates were described as 'Authoritarian' for the phonic approach, 'Democratic' for the whole word method, following Anderson and Brewer (1945.1946). Using a difference score, of attainment less predicted attainment, at the end of the instructional period as a criterion measure, interactions were detected between anxiety, compulsivity and method; high anxiety children doing well in unstructured situations and as well as average in structured situations. Results were interpreted as evidence that ambiguous situations threaten anxious children whereas structure creates

a challenge and optimum stress for the neurotic child "aroused to an energetic state without becoming confused or panicked.". In unstructured situations children low in anxiety and high in compulsivity were most successful, evidence interpreted as showing that non-anxious children may be more able to structure for themselves, thus high anxiety and lack of organizational initiative disrupt problem solving in the absence of structure. This study adds a further dimension to the simple association of extraversion and mild neuroticism with high attainment by the suggestion that the attainment is a function of personality and environment, and that qualitative changes in the latter affect the influence and relationships on the former. This is a useful insight, if a rather obvious one in retrospect, and in general terms the relatively unstructured nature of Primary schooling would imply that non-anxious and compulsive children (stable and extravert) will be highest in attainment.

McCoy (1965) has taken this issue further and in a study of 480 ten year old children has demonstrated that whilst more anxious (neurotic) children perform better at the outset of test situations children of lower anxiety improve as the situations develop. This can be interpreted in the light of Grimes and Allinsmith's study reviewed above as an example of highly anxious children responding to structure and less anxious children developing structure more slowly for themselves. McCoy points out that whilst the highly anxious were always at peak response less anxious individuals gained in achievement and overtook the previously superior attainment levels of the other group during the course of the programme. Moreover highly anxious children did appear to be impaired by their temperament in tests lacking structure, such as a drawing test.

This study adds a little more to the evidence in the area by indicating that over a period of time the initial superiority of the anxious at this age level is countered by the greater rate of improvement amongst non-anxious in test situations, and that in the less structured of these situations the anxious children were at a disadvantage. Again the evidence supports the general trend associating stability with achievement in situations other than those of short term and high stress.

Lynn (1955.1957) observing disparity between English and Arithmetic scores amongst Primary children hypothesised that anxiety would be associated with high reading and low arithmetic scores in view of the evidence from Himmelweit (1945) and Eysenck (1947) that scores on verbal intelligence tests were superior to those on non-verbal tests amongst anxious individuals. Graded word recognition, mechanical arithmetic and anxiety scores (Lynn 1955) were obtained from 80 children aged 7.5 to 11.0 years, mean age 9.6 years. Chi-square tests supported the hypotheses. Lynn comments that the results are consistent with the general theory of high verbal performance being associated with anxiety. In line with the evidence of the studies summarised above Lynn speculates that the anxious and introspective child may find 'bookish' situations congenial and so become superior in these skills. He also considers that such skills may be those most actively sponsored by parents. The findings here run alongside the other evidence if the nature of the situation is borne in mind, that is that anxiety may be associated with structured skill learning. However Lynn does not produce longitudinal evidence and it is not possible to examine his data for interactions of the type described by McCoy.

Many surveys in the field have been much more simple in concept than the above. Savage (1966) administered group tests of personality intelligence, Arithmetic and Reading to 93 children in the age range 7-11. Correlations showed a distinctive pattern in relation to each of the attainment areas, as shown below:

	Intelligence	Arithmetic	Reading
Extraversion	.267	.235	.191
Neuroticism	-.023	.082	-.217

Extraversion appears to be generally associated with achievement, neuroticism to be independent except of reading. This latter result conflicts with evidence associating reading success with neuroticism, perhaps this may be accounted for by the wide age range of the sample which includes children well past the structured learning level of reading instruction. Clearly the results show extraversion and stability to favour attainment here. Savage's evidence also indicated that Neuroticism and Extraversion in Eysenck's terms are orthogonal at this age level, supporting the general theory of personality outlined in the opening sections here.

McCandless and Castaneda (1956.b.) support Savage in a study of correlations between test scores of children in the 9-15 age range. Of thirty correlations between the vocabulary, spelling, reading, arithmetic and anxiety scores at 6 age levels, thirteen proved significant, in each case anxiety being negatively related to success. This association was most marked amongst the older children and in relation to the more complex skills, anxiety appeared to interfere more amongst girls than boys. Again the results follow the overall trend, stability being associated with success. Intelligence here showed a negative correlation with anxiety (-.28 for boys, -.45 for

girls). Bowyer (1961) in a review of stress and selection at eleven plus suggests that this may be a unilinear relationship with a slight tendency for middle range IQ children to be more anxious than children at the extremes. Here again anxiety as assessed by interview shows a negative association with success.

Rushton (1966) also considered 11+ results, although his sample of 458 children included only those with IQ's in excess of 105. His results show neuroticism to be slightly negatively related to success in verbal reasoning, English and Arithmetic, whilst extraversion is positively associated with success in those areas. Teachers did not consider anxiety to be a suitable quality for academic secondary education, whilst extraversion was considered to be related to ambition, perseverance and effective relationships. In general the well adjusted, extravert and relaxed child proved perseverant, successful and highest in their teacher's esteem. The pattern is once more for extraversion and stability to be associated with success, in this case in a rather more stressful situation than the other evidence has indicated.

Another study at this age level by Frost (1967.1968) reports evidence from 310 children, in this instance negative correlations between neuroticism and attainment were found, significant in the cases of vocabulary and reading, whilst emotionality appeared to be orthogonal to intellectual achievement, slight negative correlations between extraversion and success being well below significance.

A number of studies of achievement at Primary stage have included personality variables and offer some evidence here. In a longitudinal study of attainment in written English, Sharples (1966) found no significant co-variance of attainment with personality. However attain-

ment was positively related to extraversion, except in a more 'formal' school where introversion was associated. Sarason's (1964) evidence showed intelligence to be related to stability rather than anxiety, Sarnoff (1958.1959) indicated this relationship to be insignificant by age 11. In studies of personality constructs Digman (1947) indicated extraversion to be orthogonal to achievement amongst 6 and 7 year old children, as did Morrison et.al.(1965).

A large scale survey has been reported by Eysenck and Cookson (1969) during the course of the present study. In this, 4,000, 11 year old children completed tests of personality, verbal reasoning, mathematics, English and reading. Noting the trend of earlier studies the researchers analyse their data in respect of different sexes, age levels and interaction patterns, at the same time generalising school conditions and climates across the sample. Results showed extraversion to be related to superiority in verbal reasoning, mathematics, English and reading, girls were superior to boys and a trend emerged in which neuroticism and extraversion was related to success amongst girls, but to failure amongst boys. There was also a weak tendency for the relationship of neuroticism and achievement to be curvilinear, average neuroticism being indicative of lower scores, although this does not approach significance. The authors point out that no causal relationships can be demonstrated, but note that the problem is a complex one involving sex, subject, age, achievement and difficulty levels in addition to the usual measures of attainment and personality. Once more these results support the general trend, but question the concept of 'generality' of findings at this stage.

The problem of difficulty levels raised above was researched by Soloman (1961) amongst a group of 113 children aged 11+ who attempted

easy and difficult tests in arithmetic and English in addition to completing a personality questionnaire. No significant results emerged although stability in terms of individuality and cooperativeness in learning were correlated with success, again a result supporting observed trends. Leith and Bassett (1967) examined modes of learning and personality amongst 64 older Junior School children working on tasks involving guided and discovery learning. Results showed anxious pupils to do better in guided situations, stable pupils in discovery. Here the pattern of the Grimes and Allinsmith (1961) study reviewed earlier are replicated amongst older children, again the general trends are indicated. Banks (1964) adds further evidence in support through a study of attainment in 121 junior school children. Tests of arithmetic, English, comprehension and verbal reasoning were all positively associated with extraversion and stability. Levy et.al. (1969) conducted a one year longitudinal study of 181 children in contrasting schools comparing attainment and anxiety, interactions were complex but anxiety tended to be higher in more formally structured organizations. Anxiety towards tests appeared to be less affected by climate than general anxiety, perhaps indicating that formal climates do not promote only specific anxiety but also relate to general response.

Throughout this summary of results at the Junior age level it has been seen that extraversion and stability emerge as personality traits associated with attainment amongst junior school children, and more complex studies have revealed that this general pattern is related to the sex and age of the pupils, the nature and difficulty of the task and the climate of the school situation. In crude terms these qualifications can be summarised as showing that emotional extravert girls

are superior to their male counterparts, and emotional children achieve better in situations and climates providing a supportive structure whereas more stable pupils succeed in open situations within which they may develop a personal strategy.

Throughout the results above, anxiety, emotionality and neuroticism have been employed by researchers as allied 'type' concepts, Biggs (1962) points out that this confusion may conceal crucial differences, but that, in general, stress and neuroticism are inimical to success in achievement amongst Junior children. He points out further that the issue of modes of learning requires further investigation, and also suggests that intelligence, which appears to be related to personality at this age level, should be controlled in studies of personality and achievement. Unfortunately even the large scale studies reported above have not controlled intelligence, as Biggs suggests the results may indicate little more than the ability of pupils of high intelligence to deal more effectively with anxiety and stressful situations. This view is supported by a small scale study of 40 children of three different IQ levels (Feldsun and Klausheimer.1962). Pupils of high IQ tended to be less anxious and a negative correlation between attainment and anxiety is reported for both boys and girls. Anxiety was marked amongst low attainers in arithmetic and may function in such a way as to restrict performance rather than drive an individual to respond. As has been suggested above, failure to gain success may have aggravated further anxiety in the less able, whereas superior children may evaluate stress more adequately and be intellectually equipped to deal with it.

2.22 Personality and achievement : evidence from secondary age pupils

More studies have been conducted and reported amongst Secondary age pupils than amongst Primary age groups, whilst details of the findings are of less direct relevance to the problem of the present study the material reviewed above and the overall pattern of results contributes to further insights into the nature of the relationships of concern here.

Hughes (1934) noted that discrepancies between secondary school entrance examinations were related to personality characteristics, and Douglas (1960) demonstrated that success in Primary schooling was associated with personality. The more highly structured and formalised organization of secondary schooling, especially in terms of examination systems, facilitates research work through the availability of within-school measures of attainment in subjects of the curriculum. Cattell in two early studies of the problem amongst High School pupils found anxiety to be positively related to mathematics and verbal ability, surgency to be negatively correlated; surgency and stability were associated with less formal and artistic abilities. (Cattell.1946.b and c). Employing specially devised instruments in a study of personality and abilities of 700 Grammar School pupils Astington (1956.1960) rated successful pupils in terms of persistence, independence, dominance, interest, nervousness and stability. Dominance appeared to be independent of success, persistence, independence and interest high amongst the successful. Whilst the crude definition of traits employed in this study indicates that neuroticism is positively related to success and extraversion is independent of it the results must be treated with caution. The scales employed are poorly validated and are very res-

tricted in scope ('persistence' scores from 3 items, 'independence' 3 items, 'extraversion' 4 items) and the rating procedures employed do little but confirm that successful children in the 11 plus examination tend to get on well in Grammar school initially. As no scale intercorrelations are produced and no standard tests are employed it is not possible to suggest more than that the evidence here indicates that successful grammar school boys can be identified as being superior in persistence and interest.

Hallworth (1961.a,1961.b) reports findings from a more representative sample using scores from a more substantially validated test. Responding to Lynn's (1957) paper 900 boys and girls were surveyed in secondary modern and grammar schools. Anxiety tended to be highest amongst the secondary modern pupils, and whilst the author suggests that the secondary pupils are more introverted he also reports that tests of extraversion and introversion were not available at the time of the study. The trends were mild and not of significant dimensions. Hallworth develops a theoretical basis for the study suggesting that anxiety as measured by his test is a construct of drive and habit strength representing an excitatory potential leading in turn to high performance drive. In complex tasks, high drive (anxiety) may interfere more than in tasks of lower complexity, it is suggested, an expansion of the more general association of anxiety and success reported amongst younger children by Lynn (1957) and discussed above. Hallworth's evidence does not support either his own or Lynn's theories, but unfortunately there is no analysis of the relative complexity of the school tasks involved nor of relationships with age and sex. In general, Hallworth comments that his results conflict with Lynn's and that the only comment can be that

stability is related to attainment. In hindsight the differences between the age groups and school settings of the two studies can be seen to be of some importance in considering the conflicting results, although they were not considered in the papers.

Callard and Goodfellow (1962) in a study of 3,559 schoolboys aged 11 to 14 reviewed the validity of an inventory designed to assess personality type amongst English school children. (J.E.P.I. Eysenck.1965). Results showed lower status groups to be highest in neuroticism, but that the relationship was not a simple one. Amongst pupils of higher intelligence neuroticism was positively correlated, amongst lower intelligence groups it was negatively correlated. There were slight overall correlations between attainment and extraversation. It is suggested that the conflicting results may be related to differences between school types, in Grammar Schools neurotics being successful and in Secondary Modern schools the less structured regime favouring more stable children (a result supported by Dale's (1969) survey of anxiety amongst 1,120 1st year grammar school children). They also suggest that extraversion scores may vary with age and that the results indicate an interaction between stress and differing school systems. These suggestions are well in line with the previously reviewed studies showing interaction between anxiety and patterns of structure in learning situations. The observations on the trends of personality type scores are of interest here, in support of Eysenck's (1965.b) evidence both sexes show a gradual increase in extraversion between age 7 and age 13, after which there is a decline, whilst in neuroticism the sexes show different trends, boys declining in neuroticism from 8 to 16 years of age and girls showing an increase over the same age range.

Child (1964) considered extraversion in relation to the examination results of 138 secondary comprehensive pupils and 40 public school boys. Introversion was associated with attainment and the author suggests that this result may be related to the demands and difficulties of school examinations which are perhaps seen as tedious to the extravert. A qualitative analysis of the relative complexity and difficulty of achievement criteria may throw more light on the issue raised by these findings.

Extraversion and stability were both identified in Butcher's (1969) analysis of a wide range of variables amongst 1,000 Scottish children. The two dimensions were orthogonal and their nature supported the general Cattell - Eysenck formulation. School attainment in this study was shown to be related to introversion and stability, the trend reported by MacNitt (1930) for this age group, and Mehryar (1967) in a study amongst 79 children aged 12 to 14 years found children classed as neurotics on the J.E.P.I. to be poor at English and Mathematics.

Ainsworth's (1967) study of 230 secondary modern pupils found low positive relationships between conscientiousness, self sufficiency and attainment, and showed that a comparable sample of American children were more friendly, submissive and conscientious. Ridding (1967) reviewed the attainments of 600 secondary children who were over and under achievers. (As the criterion of over achievement was in terms of scores $\pm$ 1 SD on a verbal reasoning test it would probably be more accurate to describe these groups as of high and low ability.) In this case neuroticism and introversion were associated with higher attainment, mathematics being related to introversion, English to neuroticism. Here again the tendency is for introversion to be

associated with success as opposed to extraversion amongst younger children, Ridding suggests that this may be a function of a 'cross-over' effect between the age of 12 and 14. Whether this effect is conceived of in terms of introverted children beginning to be more successful, or of successful children becoming more introverted, is not indicated in the paper, although subsequent papers have returned to the analysis of the 'cross-over' effect.

The evidence presented by these surveys appears confused, there are clearly complex interactions present. Cattell et.al.(1966) reviewed a relatively homogeneous sample of 563 children aged 13+ and suggested that personality can contribute extensively to the prediction of achievement and erects tentative regression equations but without considering their specificity to given situations. Together with Butcher (Cattell and Butcher 1968) Cattell reviewed the problem of prediction and lists some of the variables related to the issue, including cultural background, pupil age and sex, non-linear effects of the variables and differing effects of the various achievement areas in school. The data examined in relation to these variables was drawn from a surprisingly restricted sample of 290 pupils aged 12+ in only two schools, but the evidence does indicate that introversion and independence are more favourable in less guided situations, and that extraversion and neuroticism are negatively correlated with achievement. Here again there are intriguing conflicts, the patterns associated with extraversion following other evidence from this age group, and those associated with neuroticism conflicting somewhat with previous findings. Despite these conflicts the authors suggest that personality contributes 25% to achievement variance, intelligence and motivation accounting for a further 50% and the remaining 25% being

ascribed to error, including attitudes and interests which the authors consider to be unpromising predictors.

Evidence reviewed so far in this section has pointed up the necessity for a consideration of situational variables in personality studies at this level similar to those conducted amongst juniors. Amaria and Leith (1969) attempted such a project. Focussing on the effects of cooperative and individual learning they examined the problem of increasing the learning of pupils low in confidence by matching them with children of complementary or contrasting personality. In all 283 secondary school children were involved in the study, groupings being based on combinations of intelligence, extraversion and neuroticism.

Anxious extraverts and stable introverts were best in mixed ability groups, the alternative combinations being better in matched ability groups. Amongst intelligent children the anxious were best in mixed groups, the stable in matched groups. Low ability groups were relatively unaffected by the groupings and overall the personality and achievement interaction favoured anxious rather than stable pupils. The complex set of results summarised here reinforces the earlier comments concerning the significance of situational variable in addition to adding to the evidence linking anxiety and attainment at this age. Hebron (1962) indicates that the nature of the task is important, introverts being more able in applying material to complex problems, extraverts in assimilating the early stages of new material. The pupils' experience of their learning is considered by Pickup and Anthony (1968) who gave 253 children different forms of feedback from experimental tests, indicating scores either -3 or +3 the actual performance level. The discrepancy of expected and actual mark did not interact with personality, although more able pupils did best when fed lower

marks, less able with higher marks. Perhaps this evidence simply confirms that motivation is not affected by such slight manipulations, and no broad generalizations seem possible. Trown (1969,1970) designed a more complex experiment, 308 children working with mathematics programmes based on either "example-rule" or "rule-example" principles. Introverts were superior in "rule-eg", extraverts in "eg-rule", for initial, retained and transfer learning. Trown suggests that the evidence implies the possibility of deliberate matching of method and personality and she suggests that a characteristic of teaching is the intuitive adjustment of style to pupil personality. It could be speculated here that "rule-eg" methods in programming are microcosmic examples of narrower forms of specific skill and informational instruction, often seen to be typical of more restricted secondary schooling where precepts are presented for imitation; whilst "eg-rule" models are perhaps more typical of the free wheeling type of explorative learning employed in some primary situations (Brunner 1961). These findings run alongside those of Grimes and Allinsmith (1961), McCoy (1965), and others reported above, in which structured learning was associated with success amongst anxious introverts of primary age, and are consonant with reports associating success in more structured situations in secondary schools (Grammar schools, examinations, advanced courses, mathematics) with anxiety and introversion.

Whilst a few studies have considered learning situations as a variable in this area the problem of age has been mostly neglected, perhaps because of the need for more demanding longitudinal designs to fully appraise the effects. McNitt (1930) in an early study considered introversion scores and school marks amongst 964 American children from age 13 to 18; introverts were inferior at 13 and 14, slightly inferior

at 15 and 16 and superior at 17 and 18, implying a substantial interaction with attainment and age. In interpreting these results however it is important to note later evidence which would question the reliability of the teacher estimates employed by McNitt, and to bear in mind probable interactions between methods, personality and marks already noted above. Finlayson (1969) much more recently followed up 128 school boys through three years of schooling in a grammar, technical and comprehensive school. He reports that neurotic introverts improved with age, neurotic extraverts deteriorated with age. Moreover the effects of personality increased with age. Here again the sample was restricted and schooling effects are not explored, but the author stresses the need for studies of the interactions associated with schooling and points out that whilst high neuroticism depresses the achievement of extraverts low neuroticism improves the achievement of introverts, demonstrating the complex interactional nature of the problem as opposed to simple correlational structures. A longitudinal study reported by Rushton (1969) followed up 266 from 469 subjects with IQ's greater than 105 (presumably the sample of his earlier study reported above. Rushton 1966). Two personality measures were obtained, one at 11+ and one at 15+. Stability measured at 11+ was related to success in 11+ tests and GCE, stability measured at 15+ showed no clear relationship. Extraversion assessed at 11+ was related to success, extraversion assessed at 15+ was negatively related to success. These results are very instructive, the question of the stability of personality scores will be returned to in a subsequent section but here it is important to note that amongst a single sample the 'cross-over' effect from stable extraversion being related to success at 11+ to anxious introversion at 16+ is demonstrated,

and the investigator is able to suggest that school method may be related. He observes that the active, social, open-ended climate of primary schools favours a different temperament to the formal, restricted, complex and abstract learning in secondary school. In addition to the problem of the stability of the personality measures Rushton's results must be treated with caution in view of the small sample, its restricted ability range and the crude criterion of achievement at 16+ (the 'B' factor score on Cattell's 16 HSPQ test, involving only ten items). Nevertheless this study does add to the accumulating evidence in favour of anxiety and introversion as correlates of achievement in the later stages of secondary schooling. Entwistle and Cunningham (1968) further explored the achievement and neuroticism in the light of the evidence reviewed above. 2,770 children completed a test battery including attainment and personality measures between 11 and 13, personality being assessed at 13. The results show negative relationships between neuroticism and attainment tending to increase with age, the pattern emerging being similar to that observed amongst younger age groups. Extraversion showed a more complex interaction pattern, low and high extraverts being superior to ambiverts, the sexes showed distinctive patterns with female extraverts and male introverts being most successful. Stable children were generally most successful and amongst the more able groups there was no tendency for the neurotic introverts to be superior. The authors comment on the need for further work on the conflicts present in the pattern of results, especially in that the linear relationship between neuroticism and attainment runs counter to theories of personality and task completion, and that the curvilinear relationships involving extraversion are different for the sexes. It is suggested in the paper that interactions between age and personality

should be examined as should the nature of schooling. In reviewing these results it must be noted that the personality scores were obtained during a different school year than some of the achievement data with which they are associated.

Pursuing the question of interactions at different ability levels Entwistle and Welsh (1969) examined more evidence from the sample and test battery reported above (Entwistle-Cunningham 1968), in this case the analysis takes account of curvilinear relationships be calculating correlations at different ability levels. Amongst the results those involving personality showed introverted boys and extraverted girls to be successful, in the case of both sexes high ability introverts and low ability extraverts were doing well. As the attainment criteria here were scaled teacher estimates the results may be influenced by the rating effects noted in an earlier section, certainly the trends suggest that schooling and personality interact. Differences between sexes, the authors suggest, may arise from delay in reactive inhibition in girls, although the girls in the sample exhibit higher extraversion scores than the boys it is noted that their extraversion is qualitatively different from boys in being socially rather than aggressively oriented, a speculation which might bear closer investigation. Alternatively correlation changes may be related to actual changes in the nature of success between 11 and 14.

It may be that the results above could be illuminated if more than one personality measure had been available, observations here are based on personality measured at 13, when the children were perhaps in the process of the 'cross-over' and when the relationships detected by other studies have seemed ambivalent. Repeated personality measures would inform discussion of longitudinal results, and it would be

particularly useful to have evidence of the extent to which the personality measures themselves change during the course of such a study. Nevertheless the papers reviewed show an advance on simple surveys in that they are based on tests of hypotheses arising from coherent theory rather than on speculative data gathering. Notable amongst theory has been that of the curvilinear relationship between personality type scores and attainment. Brown (1969) in a study of extraversion socres from 140 children aged 13+ found the curvilinear trend observed by Entwistle and Cunningham (1968), but the regressions were different for mathematics and verbal items from the WISC. (McKerracher and Watson 1968). Brown comments that the results may indicate a degree of task specificity in personality and attainment interaction, although high IQ introverts and low IQ extraverts are again found to be successful. It is not possible to consider a general pattern in the varied studies reported, although some shared theoretical basis seems to be emerging. Butcher et.al.(1963) in a study comparing personalities of U.K. and U.S.A. secondary pupils showed introverted and neurotic subjects to be most successful in demanding situations in secondary education. More significantly the discussion prefacing this study shows considerable insights into the problems involved, recognising that schooling factors, differential effects at different ages, problems of the definition of the variables, the effects of non-linear relationships, varying effects of different school situations and subjects, and sex differences must all be taken into account. Research since these observations has borne them out and a summary of present evidence calls for reference to all of these factors. Very crudely, neuroticism and introversion become increasingly closely associated with attainment, this being most marked amongst boys

in more restricted and structured school situations, and with tasks of greater complexity or difficulty. Extraversion, especially when expressed in asocial ways, is deleterious to success, the relationship varying between sexes. However, type descriptions as employed here may be too general in relation to the varied tasks, situations and levels of difficulty encountered in secondary school and it may be necessary to examine traits rather than types in relation to particular variables.

The evidence from secondary pupils does not present so clear a picture as that emerging from primary pupils. Perhaps this is because the relationships involved become increasingly complex, or schooling becomes increasingly differentiated, or again tasks become increasingly complex and difficult. More evidence has been accumulated from older pupils giving rise inevitably to more discussion, but it is not clear how far the dynamic interactive effects noted from 11+ onwards are also present amongst younger children and to what extent the stable extraverted high attainers at primary level become more anxious and introverted as they adjust to new school situations.

2.23 Personality and attainment : evidence from tertiary education

It is not out of place to consider tertiary education briefly as the results can be seen to offer a perspective for the evidence reviewed above. Whilst a detailed analysis is unnecessary some consideration of the general pattern is relevant. The majority of studies at this level concern University students and in very general terms tend to reveal a relationship between introversion and neuroticism and attainment. Owens and Johnson (1949) found introversion to be related to success amongst 164 male freshmen. Mandler and Sarason (1952) noted

similar effects, but in an experimental study showed high anxiety students to improve in task performance, perhaps as a result of greater drive. Students of high anxiety in this study responded better when ignorant of their achievement, low anxiety subjects showed the opposite trend. McQuarry (1953) found introversion related to success in 174 male students, as did Bendig (1960) in a class of psychology students. 60 male University students showed a curvilinear relationship of neuroticism to non-verbal intelligence, the whole group being higher in neuroticism and introversion than normal young adults, in a study by Lynn and Gordon (1961). Similar trends from 607 students are reported by Child (1969), who found Arts students more anxious than scientists. Neurotic introverts were less likely to fail in 91 students studied by Furneaux (1962), although high anxiety did inhibit students in difficult problem situations. Furneaux suggests that personality might be taken more into account in tertiary education, neurotic introverts might be identified as likely poor interviewees, supervision modified to match drive conditions to student temperament. He also observes that the student's behaviour is affected by the institution in addition to his own personality.

A gradual fall in neuroticism amongst successful students, and inverse relationships between success and extraversion, are noted by Kelvin et.al.(1965), who also consider that personality may change in relation to the experience of success and failure. Evidence favouring anxiety and introversion in association with success is also presented by Broadbent (1958), Lynn (1959) and Kline (1966).

Surprisingly high correlations of stability and introversion with success (0.9 in each case) are reported by Savage from 168 students, although the evidence here is very crude indeed. Warburton et.al.(1961)

found stability an asset to 113 postgraduate education students in practical work but not in theory, extraversion showing no relationship. Stroud (1970) found extraversion associated with success amongst 1,938 American students.

Entwistle and Entwistle (1970) attempted an analysis of personality effects at this level, noting that good study methods are associated with low extraversion and suggest that reactive inhibition may interfere with the study habits of extraverts. A similar study of a small student group (Entwistle and Wilson 1970) obtained parallel results, the authors suggesting that instruction in study method might help extraverts to overcome the learning difficulties they experience. Suggestions of this kind propose changes in specific response habits, the lowest level of personality functioning, implying that procedures should be adopted to enable students to change, if not their personality at least such aspects of it as might impair efficiency in conditions of academic study.

Little evidence is available for non-academics. Himmelweit (1945) found intelligence and extraversion to be somewhat tenuously related amongst 450 neurotic patients, Holland and Richards (1965) discovered no relationships in a study of the social activities of 7,262 students. 144 adult volunteers in the survey of Ley et.al.(1966) also showed no systematic trend, Venables (1965) found verbal ability high among neurotic extraverts amongst 388 day release students.

In reviewing these studies much of the quality of the theorising has been omitted, although this is referred to below, in an attempt to summarise the findings directly related to the present study. These can be seen to show in general, allowing for Entwistle's (1970) caution that interactions are so complex as to render generalisation misleading,

introversion and neuroticism to be related to success at tertiary level, and many commentators have observed a considerable influence of temperament on performance at this level. (e.g. Eysenck 1947.a. Furneaux 1957. Lynn 1959.)

2.24 Personality and achievement : an overview

Fifty seven researches are summarised in the sections above and these reveal a complex of interrelationships, a crude overview can be effected by simply noting the number of studies at each level and their tendency to show either neuroticism or extraversion as personality types related to attainment. Table 2.1 presents such a summary.

Table 2.1 Summary of investigations reviewed in sections 2.9 - 2.11

Age level	No. of studies	Personality type and nature of relationship with attainment					
		Neuroticism			Extraversion		
		Positive	Unclear	Negative	Positive	Unclear	Negative
Primary	18	1	1	8	13	3	3
Secondary	18	7	2	5	6	1	5
Tertiary	20	13	1	3	2	4	7

It cannot be pretended that such a table is anything but a gross oversimplification of the complex data, but a clear shift is seen in relation to age and schooling level from stability and extraversion to neuroticism and introversion as types associated positively with attainment.

A number of interesting questions remain to be answered. To what extent do the situations and tasks involved in the schools give rise to the observed results? To what extent are different individuals favoured by the experiences of learning at successive levels? Are extraverts

presented with increasingly difficult learning conditions at each level, or do intelligent individuals become more introverted in response to changing situations? Again, do the results concerning neuroticism indicate that successful subjects grow in anxiety until they have mastered the difficulties presented by learning, when they appear to become less anxious again? And to what extent do the effects noted in relation to cognitive achievement also relate to affective changes in pupils and students?

Chapter 2.

Pertinent Literature.

2.3 Personality and the conditions of learning.

Some evidence can be extrapolated from previous research and theory to provide a basis for hypotheses concerning the general questions raised in the previous section.

2.31 Personality and the conditions of learning : extraversion and conditioning

Eysenck (1957.b.) suggests that introverts condition more readily than extraverts. Reactive inhibition is built up more slowly by introverts and dissipated more quickly by them, whilst cortical excitation is higher than amongst extraverts who experience rapid inhibition and dissipate this more slowly. (Eysenck 1957.a. 1963) Eysenck sees these characteristics as functions of constitutionally determined properties of the nervous system, recognising the origins of the genotype and phenotype in terms of heredity influencing impulsiveness, environment affecting sociability. Disposition is here related directly to the CNS, implying physical and cortical structures characterising the main personality types. It has been further proposed that introverts tend to be oriented to achievement, where high excitation makes possible prolonged periods of work, whereas extraverts tend to be oriented to socializing and seek social stimulation. Society places emphasis on academic success and introverts probably introject this more quickly, finding reward in long and relatively "unexciting" periods of work. (Eysenck.1967)

Eysenck and White (1964) suggest that many school activities and

tests are "massed practice" which set up reactive inhibition to the detriment of extravert pupils.

Lynn (1970) summarises this viewpoint and comments that as introverts are less subject to interference from reactive inhibition their relative success in dealing with problems provoking cortical excitation are responded to by increasingly demanding situations being provided. When pupils show high achievement in demanding, and possibly tedious, school tasks they are considered to be suitable subjects for even more demanding, and perhaps more tedious, experiences! (Lynn.1970)

A number of the reports already reviewed support this theoretical position, both Furneaux (1957) and Hebron (1962) observe that extraverts are superior in the early stages of learning, introverts in later and more complex stages.

Amongst secondary school children, Child (1964) showed introverts to be superior, Ridding (1962) indicating this to be more marked in restricted activities (maths) than others (English). Brown (1969) observed that 13 year old introverts showed success either because they conditioned easily or because they remained unaffected by socializing in the classroom, although the relationship was different for verbal and mathematical attainment. In the former ambiverts were inferior to the extremes, in the latter the 'U' curve was inverted and ambiverts were superior to the extremes. Overall Brown's findings do not support Eysenck, extraverts being more successful, but as his sample was relatively young these results may be a function of age. Entwistle and Welsh (1969) demonstrate a similar trend and note an interaction with intelligence and sex, extraversion being associated with success amongst groups of lower ability, perhaps extraversion at this stage acts to some extent as a compensation for lower abilities.

Amongst older students Carment et.al. (1965) supported Eysenck, although extraverts did not appear to be susceptible to social influence; Lynn and Gordon (1961), Kelvin et.al. (1965) and Entwistle and Entwistle (1970) found introverts to be superior in attainment at this stage, the latter commenting that reactive inhibition may interfere earlier for extraverts amongst older students. Ley et.al. (1966) found no evidence to support Eysenck's theory, but observed that their sample was atypical and their test battery less than adequate.

The general trend here supports Eysenck's theory for attainment (theoretically a function of socialization and conditioning) to be higher amongst introverts than extraverts. In view of the differential effects of conditioning Eysenck (1960) has suggested that different personality types should be dealt with differently in school.

Overall the trends associate introversion with success, although amongst younger children both introverts and extraverts are successful. It may be that at younger ages effective introverted bookish learning can be compensated by extraverted, interactive social learning; (McQuarry) whilst methods of instruction amongst older students may restrict this; the broadly tolerant educational practice amongst younger children tends to be less associated with demands for specific pupil adjustment than the educational tradition amongst older students.

It appears that the variables of sex, subject matter, and age are significant in the interactions of achievement and extraversion. Theoretically girls, being more acceptably extravert and less absolutely extravert than boys, will evidence weaker interaction here than will boys, results from more narrow and restrictive subjects will show closer relationships with introversion than less structured subjects, older children will show closer relationships than younger children.

McQuarry's (1953) suggestion that younger introverts may be able to compensate for their inability to engage in social learning will give rise to a curvilinear relationship in which ambiverts, less able to take advantage of either learning mode, are lower in attainment. The emerging relationships can be crudely represented in the form of the curves shown in figure 2.3, in general results support such a theoretical scheme. The concepts of conditioning cannot be directly applied to the schooling of younger age groups, and the general theory of reactive inhibition and cortical excitation does not allow for the interposition of self will and motivation on the part of the learning organism.

A coherent overall scheme, rough and ready as it is, can be seen to emerge here. Amongst primary children hypotheses from this scheme would predict greater achievement for introverts in skills, for extraverts in other activities, for girls rather than boys, and for introverts to improve in attainment with age.

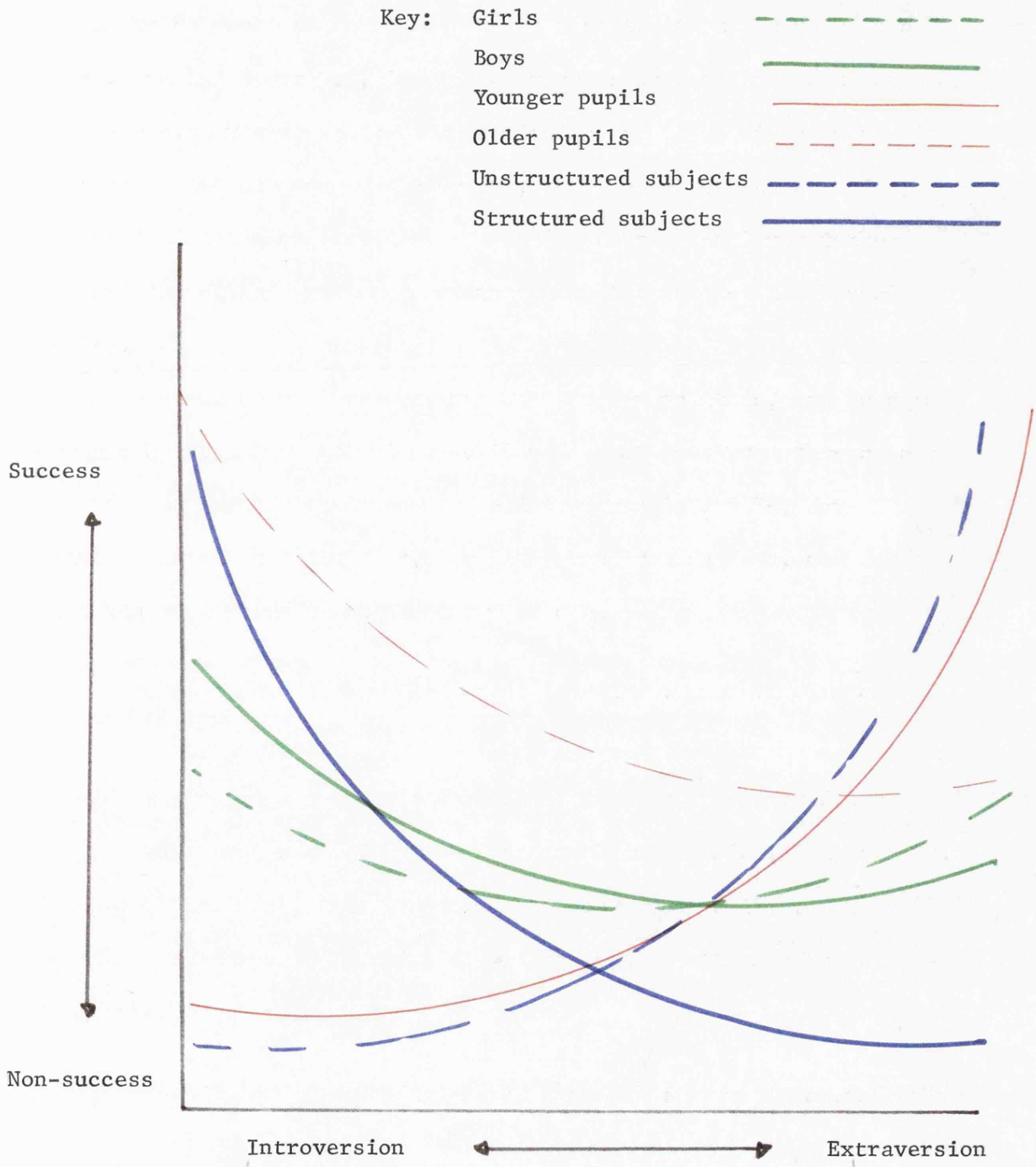
2.32 Personality and the conditions of learning : Extraversion and verbal tasks

Additional to the associations noted above there is evidence relating extraversion to higher active verbal functioning, (Himmelweit. 1945. Venables.1965), introversion to higher verbal skills. This proposition if supported would add further to the pattern of relationships evidenced above.

2.33 Personality and the conditions of learning : neuroticism and drive

Many recent papers have related neuroticism to 'drive' and have attempted to test the Yerkes - Dodson Law (1908) in relation to school children. Eysenck and White (1964) observe that it "has become

Figure 2.3 Schematic diagram to illustrate theoretical relationships between introversion - extraversion and sex, age and subject type, at the Primary stage.



customary to regard (neuroticism) as in someways synonymous with drive and postulate that simple tasks will be performed effectively amongst stable groups, but that neurotics will respond more effectively to demanding tasks.". Cattell (1963) also associates neuroticism with drive and this trait commands some attention here. In outline the Yerkes - Dodson Law postulates a relationship between the degree of drive towards task accomplishment and the level of difficulty of the task. In simple problems high drive is effective but in more difficult situations may interfere with efficiency, thus optimum drive levels vary in relation to task difficulty. The resulting function is a curvilinear one in which low drive leads to poor achievement through the absence of the urge to achieve, high drive is also related to low achievement through interference with the task when high drive produces urge for speed and completion incompatible with the complexity of the task. Lynn (1957, 1959, 1962) suggested that the law might be applied to schooling, Biggs (1962) extended this view and suggested that interactions with particular situations and intelligence levels can be found. Results from such studies as Furneaux (1962), Feldsun and Klausheimer (1962), Grimes and Allinsmith (1961), Sarason et.al. (1960), Savage (1962), and Sontag (1955), amongst pupils of all ages support this view. More critical tests of the law emerge from studies by Ley et.al. (1966) and Hallworth (1961) who find no systematic relationships, and from Entwistle and Cunningham (1968) who detect a linear relationship in favour of neuroticism, as do other studies. Child (1964) ingeniously observes that if all schooltasks are difficult then the linear relationships may well represent only one arm of the inverted 'U' curve arising from Yerkes - Dodson effects. The proposition invites an empirical test but is an attractive rationalisation of conflicting findings.

Eysenck and Cookson (1969) suggested that the tendency for the introvert to be more successful at later stages could be explained by the simple proposition that introversion is associated with 'late developers'. Such a relationship would have to account for massive numbers of examples of late development at tertiary and secondary level and begs an empirical test. The speculation could be based on the assumption that there is a direct constitutional relationship between late development and introversion, or that learning conditions change in such a way as to facilitate the later development of previously underachieving pupils. An alternative explanation is that higher attainers become increasingly introverted and their scores raise the achievement mean of the introvert groups from the lower levels found in early schooling. This last alternative is returned to below.

In this area the general scheme supports the suggestion that anxiety is associated with complex learning and older pupils, stability with more elementary tasks and younger pupils. Hypotheses arising here would predict increasingly high attainment for neurotics with age, and in relation to more difficult tasks. However the lack of confirmation for the Yerkes - Dodson effect amongst younger children may indicate that at this level no tasks are sufficiently difficult for the Law to operate fully whereas later they become almost universally difficult so as to allow only the other 'arm' of the law to operate. Perhaps there is an interaction with the cross-over effect discussed above. (Rushton.1969)

2.34 Neuroticism and Extraversion : the nature of the measures.

Eysenck (1953) has observed that recent developments in personality study have added quantification to the traditional classificatory schemes,

and the studies reviewed above have relied extensively on either the J.E.P.I. (Eysenck.1966) or Cattell's 16 CPQ or HPQ self report inventories. 'Measures' of personality arising from such tests are not without critics, Burt (1945) attacked their low validity and reliability, pointing out that the coefficients were only one half or two thirds as large as those obtained in cognitive tests, a claim still generally true. Banks (1964) showed that the differences between the two commonly employed tests may well be crucial, although research perhaps tends to lose sight of the precise meanings of the tests employed. In Banks' results mean correlations between Cattell 16 CPQ anxiety and attainment show r = -.152, between J.E.P.I. neuroticism and attainment r = -.495; for Cattell's extraversion r = .017, for J.E.P.I. extraversion r = .312. Thus the summarised relationship is consistently stronger for the Eysenck measure than the Cattell, a factor which may well influence the evidence obtained. Differences in terms of definition have been described earlier but differences of function are perhaps of greater moment.

Many studies have shown that personality and method interact at all levels, (e.g. Barker 1942, Eysenck and Pickup 1968, Haddon and Lytton 1968, 1971, Hallworth and Morrison 1964, Morrison et.al. 1965, Mukherjee 1968, Rosenthal and Jacobson 1966, Tiber and Kennedy 1964, Trow et.al. 1950, White and Lippit 1960, Wispe 1951.). The last reference summarises the situation, "for maximum learning efficiency the student's emotional - intellectual needs should be taken into account in determining the kind of instruction he should receive".

At the present time there is insufficient evidence to support the construction of hypotheses in this area, but the central problem must be to identify what forms of schooling are most appropriate in

terms of promoting achievement for the variously defined personality types.

2.35 Variability in measured personality

All that has gone before in this chapter has assumed that measured personality types, however determined, have a nature which remains relatively unaffected and unchanged over a period of time. Many longitudinal studies repeat cognitive measures but assume no variability in personality scores. In some cases test scores are related to personality measures obtained at some years distance. In view of the strictures reported in section 2.16 it is instructive to review the stability of personality scores. Many studies imply change in individual scores, for example Bayley (1940), Bergland (1965), Callard and Goodfellow (1962), Freyberg (1968), Kelley (1955), and Stewart (1964), suggest changes in score amongst widely varied subjects and settings. Within schools Bloom (1964), Cattell (1965), Eysenck (1965), Kemp (1957), Mussen et.al. (1963), Rushton (1969), and Sanford (1964) have all indicated that changes in personality may be linked to particular experiences in instructional settings, particularly that situations of greater stress and structure give rise to higher levels of introversion and anxiety.

The variability of group test scores is of course greater than that of clinical assessment (Himmelweit and Petrie 1951. Vernon 1953) and it has been suggested that the level of precision in group measurement is too low to permit anything but broad categorical grouping. (McGuire et.al. 1963) In fact this procedure has been adopted in recent studies, adopting interactional designs employing analysis of variance rather than the earlier approach of multivariate surveys and

correlation analysis with personality scores as variables in matrices of heterogeneous variables.

Eysenck (1965) observes that there is a need for personality variance to be analysed rather than consigned to error as is often the case. Rushton (1969) demonstrates dramatically the variability of personality scores, whilst simultaneous completions of the 16 CPQ and 16 HPQ gave rise to correlations of .735 and .705 for anxiety and extraversion respectively amongst 106 children, over a period of four years these fell to .096 and .129 respectively amongst a larger sample. Considerably less stable in fact than the attainment scores which were compared with them. Rushton produces evidence to show that in the four quartiles of the personality measures the constancy of score was such that on average only 25 - 30 per cent remained in the same quartile over a four year period. Clearly such measures have not the stature of status variables which they are often ascribed. Cattell (1957) theorises on the nature of this variability. In psychological terms unordered effects may produce momentary variation (oscillation) or longer term changes (fluctuation), whilst 'rhythm effects' may result from maturational and seasonal changes. Of greatest moment to the teacher are the age and cultural changes which Cattell describes as arising from learning effects whilst noting that "to the question of how far the constancy depends on a constancy of cultural milieu no full answer in yet possible". Clearly another area for empirical research. In measurement terms the stability of a test is a function of the stability of the trait measured, a perfect measure showing exactly the variability present in the trait. Dependability is more concerned with the nature of the test - retest correlations of the instrument; homogeneity with item consistency.

The researcher is presented with a situation in which, accepting the substantial evidence of homogeneity and dependability supporting the most popular scales, it is of greatest importance to isolate the sources of variability from learning effects in schools. Sears (1951) observes that the question of whether personality is an antecedent or consequent of contextual change is unresolved, it may be that in Primary schools failing children learn to be introverted and anxious, whilst in post-primary education successful students learn these behaviours. Cattell (1965) suggests that progressive schooling may give rise to a shift to extraversion. Byrne (1966) considers that such changes as occur arise from unpleasant consequences of behaviour, self-actualization, changes in stimuli and the situational context. In a behavioural model for personality change and learning he includes trial and error, habit-family hierarchies, reinforcement, cognition, and will. In the absence of suitable measures it is difficult to subject any of these speculations to a test, but classroom experiences are often directed towards and apparently result in personality change.

In view of the lack of clarity in this area it is not possible to erect well structured hypotheses which would require specific relationships to be postulated between given experiences on the one hand and particular personality change on the other. The evidence implies that both extraversion and neuroticism scores increase during the primary school, but this is a norm trend without reference to situation. A conservative but reasonable hypothesis in the circumstances would be the null hypothesis of no change in personality scores during the primary school period, for this is still an area in which speculative evidence is required to support more detailed future enquiries.

2.36 Variability of personality scores : other considerations

Two sources of variability not considered above are those related to difficulties of reading and test completion, and those arising from deliberate attempts to fake self report tests. Cookson (1970) and Eysenck (1965) support the use of the J.M.P.I. with children of reading age 8+ and analyses of reading difficulties in the J.M.P.I. indicate no problems at and above that level.

Faking is less easily dealt with, Gibson (1969) says that in general cooperation is assumed with normal subjects, and results show that it is the less troublesome groups (girls, young children, good pupils) who have highest scores on a lie scale, (Eysenck et.al.) intended to detect faking, than other pupils. However as the scale is a collection of socially approved generalizations to which no one person could reasonably consistently accede (e.g. always keeping secrets, never telling lies), it could be that 'good' 'young' children do in fact have higher scores in their own terms. In general neuroticism items are more subject to faking than extraversion (Eysenck et.al. 1966, Gibson 1964), and lie scale scores do not seem to indicate levels of delinquency. (Berry.1971)

2.37 Personality and affective learning

Research described above has concentrated almost exclusively on cognitive learning and personality, yet many teachers, especially at primary level would stress the importance of affective objectives. (Krathwolh et.al. 1964). Little research has been reported in relation to this however, although some crude developmental and situational patterns have been demonstrated in attitudes and interests. (Evans 1965) The field was surveyed by Allen (1960) who notes that attitudes towards

school decline with age, a finding replicated by Wisenthal (1965), Fitt (1956) and Sharples (1969), and that sex and school conditions are probably associated. Shakespere (1937) and Jordan (1941) show attainment related to attitude, Baraheni (1962) and Arvidson (1956) suggest that school experience also contributes to attitude. Successful children view school more favourably than others (Kniveton 1963. Fitt 1956), and girls more favourably than boys (Kniveton 1969, Fitt 1956, Sharples 1959, Wisenthal 1965).

Kelman (1969) considers that attitude change can be brought about by a process of compliance, identification and internalization, Regan (1967) indicates that favourable attitudes develop amongst extraverts, perhaps because of their hunger for social involvement and urge for social reward. Lunn (1970) found girls generally to have more favourable attitudes towards school than boys and for there to be slight interaction with school organization.

One of the problems of research in affective learning is that few scales have been developed for its assessment. Lunn (1966, 1969) describes ten scales for the measurement of attitudes towards school and Sharples (1969) devised a Guttman scale which can be applied to any school subject. These scales offer some means of assessment but the problem requires much analysis still.

In this area again no directional hypotheses can be set up in relation to personality and attitudes. The null hypothesis that personality is not related to attitude change is the only possible speculation at this stage, although trends in relation to sex and subject seem to have been substantially examined in the reports reviewed above.

2.38 Achievement in school : other factors

Whilst the present study is especially concerned with personality and schooling it is not without awareness that many other factors can be shown to effect schooling and must eventually be taken into account in this field. (Vernon 1950, Wiseman 1964). Nevertheless in the absence of large scale research facilities restriction must be placed on the extent to which such factors as heredity (Anastasi.1958), family background (Eysenck and Cookson.1970. Frazer 1959. Nisbet 1953.) cultural background (Campbell 1959. Taba 1964), social class (Bernstein 1958. Floud and Halsey 1961. Gough 1946. Swift 1966, 1967), family size (Anastasi 1956. Nisbet and Entwistle 1967. Higgins et.al. 1962) date of birth (Pidgeon 1965), school conditions (Kemp 1955) and intelligence can be taken into account. Whilst some of these variables can be controlled in a small scale study inevitably recourse must be made to assumptions of random effects in such variables across the samples within which reference is being made to hypotheses concerning a narrower range of variables.

Chapter 3.

Statement of Problem.

Evidence concerning children of Junior School age reviewed in the previous chapter gives rise to a number of hypotheses concerning the relationships between personality and the attainment and attitudes of younger children. However the general trends of the evidence from which such hypotheses derive have been chiefly identified amongst children of 11 to 13 years of age and the present study attempts to examine some of these amongst younger children. Whilst the absence of direct evidence concerning this age group hinders the development of complex theories of relationships, nevertheless the previous chapter has indicated some areas in which tentative hypotheses can be erected, although inevitably null hypotheses remain to be examined in many other areas. In this chapter the specific problems of the present study are detailed in relation to the evidence presented in chapter two.

3.1 Range of hypotheses : definitions

The present study is concerned with attainments, attitudes and personality in Junior Schools. The definitions of these terms serve as indices of the range of the hypotheses.

3.11 Junior School Children

Children enter the Junior School in the year in which they attain the age of 7 or 8, and enter the Secondary School in the year in which they attain the age of 11. The mean age of year groups of children in Junior School, as at January 1st, are 7+, 8+, 9+, and 10+. In the present study the concern is with the three older year groups and the

term 'Junior Children' relates only to children within this range.

3.12 Attainments

Differentiation can be made between 'abilities', as potential for achievement, and 'attainment' as specific measured samples of achievement. In effect 'abilities' are often assessed by means closely similar to those used for measuring attainment, commonly pencil and paper tests. In this study 'attainment' defines measures of achievement in spelling, reading, comprehension of written material, computation, numerical problem solving, and measures of reasoning abilities assessed through tests of verbal and spatial abilities. The hypotheses below relate only to 'attainment' in these terms.

3.13 Attitudes

Defined in terms of disposition of opinion and interest, 'attitude' is essentially linked with specific expectancies of experience and with appropriate responses. In the absence of large scale and highly specific observational techniques, responses to attitude scales and questionnaires are commonly accepted as indices of attitudes, and the content of such scales determines the objects towards which attitudes are considered to be held. In relation to school, attitudes of children concern both the curriculum activities and the social context of the school within which the activities take place. Common elements in the curriculum of junior children are reading, mathematics, story writing, art and physical education. The social context of schooling can be considered in terms of such elements as the favourability with which school is viewed, interest in school work and its importance for the child; views of the class, its image with others, the desire to

conform within it and the child's relationship with the teacher; anxiety about school, the level of adjustment to the class and the self image of the pupils.

In this study 'attitudes' defines responses to measurement scales concerned with the range of attitudes towards the school and curriculum as indicated above. The hypotheses below relate only to 'attitudes' in these terms.

3.14 Personality

Problems of definition in this area were a substantial concern of the previous chapter. In the present study the terms 'extraversion and introversion' and 'neuroticism and stability' relate to scores obtained by individual junior children on appropriate scales designed to measure personality dimensions at this age level; in the hypotheses 'personality' defines these responses in general terms.

Discussion of the hypotheses employs the terms Junior Children, attainment, attitude and personality, in the sense defined above unless indicated otherwise.

3.2 Hypotheses concerning personality and junior children

The evidence reviewed in chapter two indicates that it is reasonable to hypothesise that extraversion mean scores will tend to be higher for older children than for younger juniors, as will neuroticism mean scores; and that boys will be higher in extraversion and lower in neuroticism than girls. (See section 2.35 above.) Evidence concerning individual variation in personality is confused and the null hypothesis can be advanced that junior children classed as of high, moderate or low standing in extraversion or neuroticism score will be similarly

classed at each year level from 8+ to 10+. (2.35, 2.36.)

In addition to such general patterns, more specific hypotheses can be developed in relation to changes in personality. Previous evidence, whilst relating high attainment with stable extraverts below age 12, and with neurotic introverts after this age, does not account for the nature of the differences giving rise to the results. Is it that high attainers at 10+ change from stable extraversion to neurotic introversion and remain the high attainers at 14+, or is it that the individuals high in attainment at 14+ are different individuals from those high in attainment at 10+? In other words it has not been established whether the results of personality and attainment studies arise from changes in personality amongst high attainers, or from different groups of high attainers emerging at 14+ from those of comparably high attainment at 10+. Most cognitive predictions at 10+ of attainment at 14+ suggest that 10-12% of variance is not accounted for by the tests, but do not evidence the regressive shifts between attainment groups which would result from a crossover effect unaccompanied by individual personality change. The suggestion has been advanced above that more able children may adjust more adequately to changes in learning environments and may change their behaviour in such a way as to remain consonant with that associated with high attainment at each age level.

Amongst high attainers there may be a movement away from stable extraversion towards neurotic introversion, and this trend may be evidenced before it becomes recognised as the inversion of performance at the "cross-over".

3.2 Hypotheses summary : personality and junior children

Within the definition of terms given in 3.1 above, the following hypotheses are examined in this study:

H1 Extraversion mean scores are higher for older than for younger junior children.

H2 Neuroticism mean scores are higher for older than for younger junior children.

H3 Neuroticism mean scores are higher for girls than for boys amongst junior children.

H4 Extraversion mean scores are higher for boys than for girls amongst junior children.

H5 Junior children classed as of high, moderate or low standing in extraversion at 8+ are similarly classed at 9+ and 10+.

H6 Junior children classed as of high, moderate or low standing in neuroticism at 8+ are similarly classed at 9+ and 10+.

H7 Extraverted junior children who are high in attainment will tend to become increasingly introverted with age, in relation to their peers.

H8 Stable junior children who are high in attainment will tend to become increasingly neurotic with age, in relation to their peers.

3.3 Hypotheses concerning personality and attainment amongst junior children

Evidence reviewed in the previous chapter indicates that it is

reasonable to hypothesise that amongst junior children extraverts will be high in attainment, as will children low in neuroticism, (see sections 2.24 above). These trends will be expected to be most marked amongst younger children (2.21, 2.22). Theoretical propositions relating personality to task type indicate that the superiority of extraverts will be less notable in restricted activities, such as tests of reading or spelling skills, than in those offering greater scope for individuality, such as in open ended questions of 'comprehension' tests or in creative writing activities, (2.31). As is commonly found at this age level girls will be expected to be higher in attainment than boys, (2.31); but in the absence of evidence for this age range the null hypothesis may be advanced that there is no significant interaction between sex, personality and attainment. As attainment is here defined in terms of standardised test scores, and as such scores are adjusted for age differences through the use of score norm conversion tables, no hypotheses need be advanced here concerning the superiority of the attainments of older in relation to younger children. However the interaction of personality and age hypothesised above (H6, H7) is related to attainment, the trends noted in previous research for stability and extraversion to become less closely associated with superior attainments with age, suggests that the attainments of neurotic children at 10+ will not then be as inferior to those of stable children as may be the case at 8+. Similarly the attainments of extraverts at 10+ will not be expected to be so superior to others as may be the case at 8+ (2.33). As previous evidence associates extraversion with verbal attainment particularly it is hypothesised that the superiority of extraverts at each age will be greater in verbal attainment than in other areas (2.32).

Previous evidence suggests dynamic patterns of interaction between personality and attainment, leading to the 'crossover' effect at 14 or thereabouts when the superiority of stable extraverts in attainment gives way to a superiority of neurotic introverts. Whilst these patterns can be detected by cross sectional studies at successive age levels, changes in the patterns of relationships must result from different trends in changes in attainment. For, if high neurotics at 14+ are superior in attainment, whereas at 10+ low neurotics were superior, then the observed differences must result from different degrees of development in attainment; allowing for initial differences high neurotics appear to show greater gains in attainment than stable children. Alternatively, of course, the effect may be explained in terms of differential degrees of change in personality, high attainers becoming increasingly introverted and less stable with age. These dynamic effects may operate amongst age groups considerably younger than those amongst whom the crossover has been detected, and may be evidenced amongst junior children. Indeed the crossover is probably most usefully interpreted as the point at which differential rates of attainment, or differential trends of personality growth, are evidenced rather than as a sudden and dramatic swing in relationships between personality and attainment. In the absence of evidence concerning changes in personality and changes in attainment levels at the junior stage the null hypothesis can be advanced that there are no differences between the attainments of extraverts and introverts, or between stable and neurotic children, when mean scores are adjusted for initial differences.

Evidence reviewed above (2.31, 2.32, 2.33) indicates that interactions between attainment and personality differ at various personality

levels. Theoretical curvilinear relationships have been proposed and some research evidence supports this idea, however the general nature of the evidence suggests that the problem is a complex one involving the nature of the task presented in various attainment areas, levels of pupil ability, age and sex, in addition to attainment and personality levels. In the absence of previous evidence from the junior age group it is appropriate to advance the null hypothesis that interactions between personality and attainment do not depart from linearity at this age.

3.31 Hypotheses summary : personality and attainment of junior children

Within the definition of terms given in 3.1 above, the following hypotheses are examined in this study.

H9 Attainment mean scores of extravert junior children are higher than those of introverts.

H10 Attainment mean scores of stable junior children are higher than those of neurotic children.

H11 The superiority of extravert junior children in attainment at 8+ is more marked than that obtaining at 10+.

H12 The superiority of stable junior children in attainment at 8+ is more marked than that obtaining at 10+.

H13 The inferiority of introvert junior children at 8+ is more marked than that obtaining at 10+.

H14 The inferiority of neurotic junior children in attainment at 8+ is more marked than that obtaining at 10+.

H15 The superiority of extravert junior children in spelling, reading, and computation (restricted activities) is less marked than that obtaining in comprehension and numerical problem solving (less restricted activities).

H16 The superiority of extravert junior children in comprehension and verbal reasoning (verbal activities) is more marked than that obtaining in numerical problem solving and spatial reasoning (non-verbal activities).

H17 The attainment mean scores of junior girls are higher than those of junior boys.

H18 There is no interaction between sex and personality in relation to attainment amongst junior children.

H19 There are no significant differences between the attainment mean scores of extravert and introvert junior children when these means are adjusted for initial differences.

H20 There are no significant differences between the attainment mean scores of neurotic and stable junior children when these means are adjusted for initial differences.

H21 The relationship between extraversion and attainment is a linear one amongst junior children.

H22 The relationship between neuroticism and attainment is a linear one amongst junior children.

3.4 Hypotheses concerning personality and attitudes amongst junior children.

In the absence of previous research it is not possible to advance directional hypotheses concerning relationships between personality and attitudes at this age level. Girls and younger children might be expected to show more favourable attitudes than boys (2.37), but in other areas only null hypotheses are appropriate.

3.4 Hypotheses summary : personality and attitudes amongst junior children

Within the definitions of terms given in 3.1 above, the following hypotheses are examined in this study.

H23 Girls hold more favourable attitudes towards the curriculum than boys.

H24 Girls hold more favourable attitudes towards school than boys.

H25 Extraversion is not related to attitudes towards the curriculum.

H26 Neuroticism is not related to attitudes towards the curriculum.

H27 Extraversion is not related to attitudes towards school.

H28 Neuroticism is not related to attitudes towards school.

3.5 Hypotheses concerning the interaction between personality, attainment and the differences between schools

A dynamic pattern of interaction between personality and attainment has been hypothesised above, and the nature of the learning environments provided by schools may be related to the observed differences. It has been suggested that the tradition of junior schooling encourages outgoing, voluble, self-confident children, whereas secondary schooling is more congenial for quieter, conforming and restrained children. Within a given age range such generalizations are very great and it is probable that different schools create situations which encourage attainment amongst different personality groups. In the absence of other evidence the null hypothesis must be advanced that there are no differences between the relationships between attainment and personality as between different schools.

3.5 Hypotheses summary : personality, attainment and differences between schools

Within the definition of terms given in 3.1 above the following hypothesis is examined.

H29 Relationships between personality and attainment do not differ as between schools.

3.6 Principles of testing the hypotheses

Schaie (1965) indicates that it is important to consider both age and temporal factors in developmental studies, and suggests that analyses of variance techniques are appropriate for this task. Owens (1953) argues that ideally successive cohorts should be analysed in longitudinal designs to obtain the advantages of both cross sectional and follow up studies. It is suggested that longitudinal data is of particular importance and that in the absence of control data from successive cohorts care should be taken to describe the sample fully in order to indicate its representative nature. Follow up studies have led to the development of appropriate cognitive tests in parallel forms, and Pilliner (1965) and Gourlay (1953) discuss appropriate experimental models through analysis of variance and co-variance, urging the development of designs testing specific hypotheses rather than general speculations, a plea also entered by Finlayson (1969). Developments in research design (Burt 1966, Dayton 1970, Edwards 1968, Duncan 1957, Kramer 1957) have facilitated the use of designs based on intact school classes, in which restrictions on cell sizes and multiple 't' tests arising in factorial problems are dealt with by appropriate statistical treatments preserving all the data, rather than through the random exclusion of cases and the resultant loss of information and

wastage of sample.

Discussion above has suggested that the interaction of attainment and personality is dynamic, and that some aspects of the relationship might only be identified through the analysis of longitudinal data from a single sample rather than from cross sectional evidence from different groups. A review of previous evidence also reveals that there is little or no evidence to show the patterns of attainment and personality interactions amongst younger children. The present study examines the hypotheses detailed above through data obtained from a single sample, at each year of the junior school. The data are examined cross sectionally through analysis of variance, and longitudinally through analysis of co-variance. In view of the relative instability of personality scores the analyses are based on personality measures taken closely in time to the attainment tests on which data are based for the comparisons discussed here. Further hypotheses concerning between school differences are examined by chi square. The techniques and the nature of the test procedures and sample are described below.

Chapter 4.

Design of the Study.

In order to investigate the problems and test the hypotheses described in the previous chapter a longitudinal study was designed, in which changes in attainment and ability and attitudes amongst Junior children could be observed in relation to their personalities. The basic feature of this design was the repetition of a test battery amongst a sample of Junior children on three occasions, at one year intervals, and the collection of additional information in respect of their schooling and status obtained during a period of teaching each of the classes concerned. The methods and analyses employed are described here, the selection of the sample is described below, further details of the sample in terms of the test battery are given in the following chapter (5).

4.1 Sample

The sample employed in the survey was selected initially on the following criteria. Firstly the nature of the survey materials required that the children should have basic skills of reading and writing in order to complete the tests (see below). Secondly the wide variety of organisational patterns, in relation to size and ability levels found in Junior Schools, suggested that schools of representative size and ability range should be represented in the sample. Thirdly the longitudinal nature of the study necessitated continuing contact with schools and regular access to classrooms, this could have been considered a disturbance in certain circumstances,

ease of access and co-operation from L.E.A.'s and individual schools were essential.

To ensure that the test materials and conditions would not be beyond the skills of the sample, the survey was commenced amongst 8-9 year old children in the second year of Junior Schooling. The great majority of these children would, in the normal range, be expected to cope adequately with the reading and answering of test materials. Problems of surveys amongst younger children are described by Cookson (1970), and by Savage (1966) who illustrate results from children aged 7+.

In order to identify a group of schools which would be accessible for field work over a three year period and which would also be representative of the range of school size and pupil ability the advice of Local Education Authority Inspectors and College Lecturers was obtained. These persons were familiar with the schools and the pupils and were able to suggest seven schools which were accessible, represented pupil abilities in the normal range, varied in size, and which would be likely to prove co-operative over a period of three years.

Individual schools were approached and their co-operation sought. To keep disturbance of school programmes to a minimum it was suggested that intact classes would be included rather than random groups or proportional samples from different classes. In each school both staff and L.E.A. were willing to co-operate and to offer access to th e classes for testing and observation over the period of study. All schools were in areas where 11+ selection was no longer in force. Informal discussions were held with the staff at each school in order to describe the survey, to answer any questions which might arise as to the nature and purpose of the work, and to establish an informal

climate within which the investigator could co-operate with staff in carrying out the testing programmes. Staff were assured of the confidentiality of the data obtained and schools were assured that results which might be of interest to them would be made available.

The areas in which the schools were located were not widely different, each possessing a variety of background, probably slightly biased in favour of owner occupied housing and higher social class. The schools were distinguished by the size of their Junior Departments, two were of one class only, one of three classes, one of four classes, two of eight classes and one of sixteen classes. One of the single class schools proved too inaccessible for fieldwork, and after one year of the study the four class school experienced such severe staffing difficulties that the study was discontinued there at the request of the Local Education Authority. The survey was conducted in the five remaining schools.

As was anticipated the sample fluctuated in size over the period of the study. Nisbet and Entwistle (1970) point out that a 10 percent wastage can be expected in studies extending over a full school year, this figure would be considerably inflated in a study involving a testing programme involving a large number of tests conducted over a period of three years.

Additionally wastage occurred amongst children at the extremes of the ability range. Where pupils were unable to read the test material, and where verbal reasoning and educational attainment scores indicated a level of ability which could not be assessed by group tests the children concerned were not included in the battery. In effect this meant the exclusion of children scoring at the lowest

extremities of tests of reading and verbal comprehension. It is an elementary principle of testing that group test scores are less reliable amongst groups of low ability (e.g. Vernon.1960., Cronbach. 1961.). In the present study the dependence on group testing precluded the inclusion of children in the lowest ability range, however, as the test materials were untimed (see below), it was possible to encourage slower children and to enable all but the lowest achievers to complete the materials. Wastage also occurred amongst the most able from two schools in one area which encouraged early transfer, three children of outstanding ability transferred to Comprehensive schools in their third junior year and could not be included in the sample.

Some slight wastage occurred through transfer between schools, prolonged absence, and transfer into other classes. Where this latter occurred it was at times associated with problems of individual weakness in attainment, further restricting the range of ability in the sample.

Problems of absence were dealt with by two strategies. Firstly return visits were made to repeat tests with absentees wherever possible. Secondly, where a child had completed a substantial part of the battery, but had been absent for one element of it, regression equations were set up from test - test correlations of each test in the survey battery, these were calculated within the sample and are are summarised in table 4.5 in a following section. (90% of tests in any one year was taken as an arbitrary minimal level for retention in the sample.) From these regression equations predicted scores were calculated to complete the data of individuals for whom more than 90% of the test data was already available and who had completed

tests in the previous year on which predicted scores could be based. Attainment predictions, where test - test correlations showed a general trend over the whole sample, were derived from equations using the entire data; for attitudinal scores, where test - test correlations appeared to be more particular to classes and schools, the equations were contructed within individual classes and schools. Over the three years of the study of the 16,249 test scores used in the final sample 705 scores, or 4.3% of the whole, were based on predictions of this kind. By means of these approaches to the testing wastage was kept down to 17.3% of the initial sample. Complete data were obtained for 234 children and were used for the analyses of this study, additional data obtained from children not included in the final sample as they completed less than 90% of the battery, were utilized in estimates of the reliability, validity and discrimination of the test materials, as described below.

Table 4.1 summarises the sample as at Jan.1. of the third school year, showing the composition of schools, classes, numbers and sexes of the sample, together with data of mean age and ability levels for each.

Table 4.1

Sample : as at Jan.1. 1970; third year of junior school; age 9+

School Code	Class Code	Boys n	Girls n	Age X	Age SD	V.Reasoning † X	V.Reasoning † SD
	A_1	16	13	9y 8m	3.0m	95.97	12.54
	A_2	20	11	9y 9m	3.7m	94.68	11.94
A	(1+2)	36	24	9y 9m	3.4m	95.30	12.15
B		6	5	9y 10m	2.4m	95.50	9.54
C		3	3	9y 7m	3.2m	106.00	8.54
D		20	17	9y 10m	3.1m	92.66	13.11
	E_1	12	19	9y 9m	3.4m	91.63	11.35
	E_2	15	16	9y 7m	3.5m	90.66	14.34
	E_3	15	14	9y 8m	3.8m	91.05	12.31
	E_4	19	10	9y 8m	3.5m	94.41	14.88
E		61	59	9y 8m	3.5m	91.91	13.20
T		126	108	9y 7m	3.5m	93.43	12.84

† France-Wiseman V.R. Test. 2a. Norm X = 100 SD = 15

It will be observed that the means of the sample in the V.R. test shown in table 4.1 are considerably lower than the norm mean of 100. However the test constructors, (France and Wiseman.1966), report similar variations between geographical areas in their reliability trials and suggest that variability arising from differences in location may be much greater than has been previously thought, or than has been evident in test data normed on samples drawn from a variety of areas. In the case of the present study, in view of their consistency across the whole sample, the differences were considered to be indicative of variations between geographical areas. As no comparisons with scores or achievements from other geographical areas are being made here the mean values represent comparable levels of achievement within this sample only. Further details are presented in Chapter 5, where the attainment and personality scores of the class groups are presented.

The sample was representative of a variety of types of Junior schools in terms of size and organisation, and of children within the normal ability range and middle to lower middle class social level. Differences between schools are less representative being drawn from restricted numbers and examples rather than from a random or a fully representative sample. However, considered in relation to the description of the schools given in Chapter 5, the differences between schools can give a crude indication of the relationship of the results with organisation, method and approach adopted within schools and facilitate an estimate of the schools' contribution to the variance observed. The essential field

characteristics of realism were well preserved by fitting the testing sessions within the normal timetable as far as was possible, and by employing materials and approaches as close to normal classroom 'activities' as possible. Section 4.3 describes more fully the conditions under which the testing was conducted and summarises the timetable of the investigation.

In order to identify the sample in terms of school and age level the code letters shown in table 4.1 are adopted throughout this report, the three years of schooling during which the data were gathered are identified by reference to the average age at Jan.1. during that year viz. 8+, 9+, 10+, corresponding to the second, third and fourth year of Junior Schooling at the time of the testing.

4.2 Methods of Enquiry

The longitudinal survey of the sample described above took the form of a field study consisting of a number of tests and observations designed to provide evidence of the personalities of the children, their attainment, ability and attitudes, and the condition and characteristics of their schools. The instruments and techniques employed are described below.

4.21 Personality

In view of the size of the sample, the limited availability of field workers and the importance of reducing interference with the schools it was not possible to consider projective or individual personality tests and a suitable group, self-report test was required. In this country studies of personality and school attainment have

commonly employed the Junior Eysenck Personality Inventory (Eysenck, 1965). The instrument was constructed using British samples and there is an increasing volume of evidence covering personality in schoolchildren assessed through its use. These factors alone suggest that the inventory should be preferred to less commonly used alternatives, some of which have been discussed in Chapter 2.

The J.E.P.I. yields scores on the dimensions of neuroticism and extraversion, following Eysenck's (1960) theoretical formulation of major personality variables. A lie scale is also included and serves as a check on faking whilst also offering additional evidence at present not fully explored. (Eysenck.1965; Eysenck.et.al.1971; Gibson.1964; 1969.)

Norms for the test are given by Eysenck (1965) and have been supported by a number of studies (e.g. Banks.1964; Berry.1971; Child.1964; Cookson.1970; Entwistle.1968; Eysenck & Cookson.1969; and so on). Reliabilities of the test are not high and reported for only small groups at each age level, moreover the extent to which the test reflects possible changes in personality has not been established by longitudinal studies. Accordingly the present study included the use of the inventory in each year of the study, and data were obtained to compare the characteristics of the test amongst the present sample with those given in the test manual. Table 4.2 summarises the test - retest coefficients obtained from the sample together with those given in the test manual.

Table 4.2 Reliability coefficients J.E.P.I.

Split Half reliabilities (From Eysenck.1965. Averaged r)

	E	N
Age 8+	.60	.79
Age 9+	.65	.80
Age 10+	.66	.82

Test - retest reliabilities (From Eysenck.1965.)

	E	N	Period between testing	Present Sample E	N	Period between testing
Age 8+	.63	.71	One month	———		
				.51	.53	Twelve months
Age 9+	.60	.73	One month	———		
				.55	.52	Twelve months
Age 10+	.64	.79	One month	.63	.55	One month

As can be seen in the table the present sample evidenced much lower test - retest reliabilities than those reported in the manual data. Three explanations can be advanced for this, most importantly the period between testing was twelve times that of the published data and the discrepancies may be a function of different periods of elapsed time, where testing was repeated after only one month the E scale coefficient was close to that of the manual data. However, the differences may simply represent the extent to which the personality attributes varied during the period of one year. Again, the present sample, whilst not smaller than that of the manual population for test - retest data, may be more restricted in range of score, although the S.D.'s obtained do not indicate a smaller variance. Probably the differences are best accounted for by an interaction of the first two suggestions, certainly they represent an interesting aspect of the test, one which is returned to in

subsequent discussion of the results of this study. A further possibility is that the instrument is less stable with younger age groups, where it has previously been little used. However, Cookson's (1970) evidence suggests that completion of the J.E.P.I. presents no difficulties to children with a reading age of 8.0 and over, the present results would fall within the limits he suggests. It was possible to check the test - retest correlations over a two month period at age 10+ with a group of 100 children in the sample. This produced coefficients of .63 for E, and .55 for N, suggesting that in the case of Extraversion at least the shorter elapsed time enhances the coefficients. Neuroticism scores remained relatively unstable, although the numbers involved are small, and higher co-efficients might have been expected had the data been available for the whole sample.

In view of the characteristics of the stability of the personality scores described above, and the longitudinal nature of the study, the test scores were recorded for each year to obtain scores on tests taken as close in time as possible to the attainment data. Scores were recorded in raw form and were used to define three categories, roughly equal in numbers, on each dimension. Thus 'neurotic', 'average' and 'stable' groupings were made on one dimension; 'extrovert', 'ambivert' and 'introvert' on the other. This treatment of the data has two advantages, firstly in avoiding exaggeration of the specificity of the measures, secondly in facilitating a nine-fold classification of personality within which a zone analysis could be carried out, as suggested by Eysenck (1966), by grouping the sample in terms of each dimension simultaneously.

The test manual gives norms for the test scales at each age level, table 4.3 shows these for both sexes together, and also indicates comparable data from the present sample.

Table 4.3

Norm data for personality scales

Age	Published norms from Eysenck (1965)						Present Sample					
	Extraversion			Neuroticism			Extraversion			Neuroticism		
	n	X	SD	n	X	SD	n	X	SD	n	X	SD
8+	866	16.37	3.20	866	11.49	4.82	234	16.03	3.64	234	12.88	4.70
9+	1,039	16.75	3.49	1,039	11.83	4.73	234	16.55	3.55	234	13.07	5.10
10+	1,134	17.30	3.25	1,134	11.71	4.57	234	17.42	3.73	234	13.03	5.02

It will be noted that these results suggest that the test indicated a higher level of neuroticism amongst the present sample than in the norm population, differences which are significant at each age level ($p<.01$). However the overall pattern suggests that the test operated amongst the sample in much the same way as suggested by the manual. The question of the inflated neuroticism scores in relation to the interpretation of data of the present investigation is returned to in the appropriate section. Lie scale scores were not analysed in the present study.

It should also be noted that in the summary of norms given here the data are shown for both sexes together, the question of between sex differences is also treated in the section concerned with the analysis of the investigation. The instrument is presented in appendix iii

4.22 Attainment and Ability

Measures of attainment were required as indicators of school

performance for comparisons between schools and personality groups. As the study also sought to examine differences between successive stages of the Junior school a battery of tests was required which would offer appropriate material for each age level and would provide data for comparisons between tests completed in successive years. This required that the test materials should be normed on a single group and should be developed as equivalent forms for the three age levels involved. In view of practical considerations it was also necessary to obtain a battery of tests which could be completed within 4-5 hours, or 6-8 visits to the school for 40 minute testing sessions each year. Another criteria for the test material was that it should conform sufficiently closely to normal school activities to be acceptable to the children and teachers concerned; as over the survey period individual children spent some 15 hours on these materials alone this was an important consideration.

A survey of available materials revealed the "France Wiseman Guidance Programme" (France & Wiseman, 1965) as a test battery meeting these requirements. The programme consists of three parallel batteries of tests, one battery for each of the year groups 8+, 9+, 10+. Each separate battery includes the following tests in closely parallel forms:

Comprehension	Questions on a number of passages	(38 items)
Vocabulary	Choice of one out of five definitions for each of 14 words	(14 items)
Verbal Reasoning	Choice of one out of five or six words to complete a group of five words	(20 items)

Non-Verbal Reasoning	Choice of one out of five or six diagrams to complete a group of five diagrams	(16 items)
Addition & Subtraction	15 of each	(30 items)
Multiplication & Division	15 of each	(30 items)
Spelling	26 sentences with a missing word. Testee writes in the word when the complete sentence is read aloud by the investigator	(26 items)
Reading	Graded word recognition	(36 items)
Arithmetic Problems	Weights and measures Money Number series	(36 items)
Mechanical Arithmetic	Thirty examples (+ - x -)	(30 items)

These sub-test sections are summed to give scores in Spelling, Reading, Number, Comprehension (and Vocabulary), Verbal reasoning, Numerical Problem solving, and Non-verbal reasoning. The authors indicate that the battery was especially designed to meet the need for a set of tests standarised on the same population so as to yield comparable norm scores at different age levels (France & Wiseman, 1966). Split-half reliabilities given in the manual were calculated from test standardisation data gathered in the Midlands in 1965, and are shown in Table 4.4.

Table 4.4 Split-half reliabilities of attainment tests (France Wiseman. 1966)

Age level	n	Split-half r
8+	2,354	.980
9+	2,199	.966
10+	2,144	.978

The authors of the tests produce evidence from factorial analysis of the test scores to support the groupings of the test items (France & Wiseman,1966) and show that factors were extracted with loadings corresponding to the groupings suggested: Comprehension and vocabulary was the test which showed greatest generality and appeared to be a verbally loaded test of general educational achievement.

The split-half reliabilities given in the test manual were not checked in the present sample, but test - test correlations, with a period of twelve months between each testing, were calculated as is shown in Table 4.5.

Table 4.5 Test - test correlations of attainment tests. [parallel forms]

Test	$r_{8+.9+}$	$r_{9+.10+}$ [n = 234]
Spelling	.846	.827
Reading	.640	.817
Number	.659	.845
Comp/Vocab	.759	.765
V.Reasoning	.483	.408
Number problems	.774	.758
Non-Verbal reasoning		.514

Inter-correlation between the tests, averaged over the three batteries, are shown in Table 4.6 together with parallel data calculated from the sample of this study.

The coefficients obtained in the present study are somewhat smaller than those of the reliability evidence in the manual. This is probably a statistical artefact arising from the correlation being calculated from a restricted range of ability and a small sample.

Table 4.6. Intercorrelations of attainment tests, averaged over 8+, 9+, 10+.

France Wiseman (1966) data above diagonal. [n = 6,697]

Present data below diagonal. [n = 702]

Test	1.	2.	3.	4.	5.	6.	7.
1. Spelling	-	.84	.67	.74	.65	.69	.47
2. Reading	.67	-	.64	.76	.66	.69	.48
3. Number	.53	.41	-	.71	.63	.77	.54
4. Comprehension & Vocab.	.69	.63	.57	-	.73	.79	.57
5. V. Reasoning	.43	.38	.45	.64	-	.73	.58
6. Num. Problem	.46	.31	.73	.59	.48	-	.62
7. Spatial Reasoning	.30	.29	.52	.54	.34	.52	-

The general trend of the analysis of the tests suggests that they are acceptably reliable, show close correlation between the parallel forms for the three age levels, and offer a sampling of educational attainment in a number of areas, which from the inter-correlation table appear to be independant of one another. In terms of content the tests were also suitable for the study, being made up of material not unfamiliar to Junior children. An additional recommendation was that the tests are untimed and could be used more flexibly in testing sessions, in particular the absence of time limits made it easier to include results from slower children who might have failed to produce acceptable levels of performance under speeded conditions, and avoided some of the problems of inter-action of test conditions and personality. (Frost.1968., Grimes & Allinsmith.1961.)

The France - Wiseman Tests were therefore adopted as measures of attainment in the present study, the present writer conducted all the testing sessions in all the classes throughout the survey in order to provide for uniformity in procedure. Raw scores arising from the tests are subject to the known relationships with age and were corrected by means of norm tables in the manual. In addition to adjusting the scores for age differences the norm tables transform raw scores on the sub-test groups to standardised scores, $\bar{X} = 100$, SD = 15, on the groupings indicated above. In view of the rather low number of test items and the probable guidance function of the tests the published norms are not elaborated. In order to guard against errors arising from teachers attaching undue importance to small individual differences transformed scores are given at only 15 points between $\pm$ 2 SD, for each two monthly age group for the target popula-

tions. For the present purposes these tables were not fully satisfactory, firstly the conventional norm of 100 with a standard deviation of 15 produces rather unwieldly scores for extensive calculating and is wasteful of punched card space, secondly as the present study is concerned with the group trends rather than individual guidance the error margin of a single score was not a crucial factor, and consequently the rather general groupings of scores presented in the published standardisation tables was extended. The standardised scores were transformed to a mean of 50, SD of 10, and the norms were extended by intrapolation to include equivalent standardised scores for all raw scores rather than for the 15 points given in the tables. Graphical methods were employed for these transformations and norm tables were constructed for each month of age for each of the test groups, spelling, reading, number, comprehension, verbal reasoning, numerical problem solving and non-verbal reasoning. Samples from each table were checked by direct computation to ensure accuracy of the transformation. In subsequent tables and analyses of this study the attainment test scores were obtained from the France-Wiseman Programme, transformed as described. Examples of the sub-tests of the battery are given in the appendix.p.iii- x

4.23 Attitudes

Two areas of attitudes were measured, firstly attitudes towards the curriculum, secondly of attitudes towards the psychological climate of the school and class.

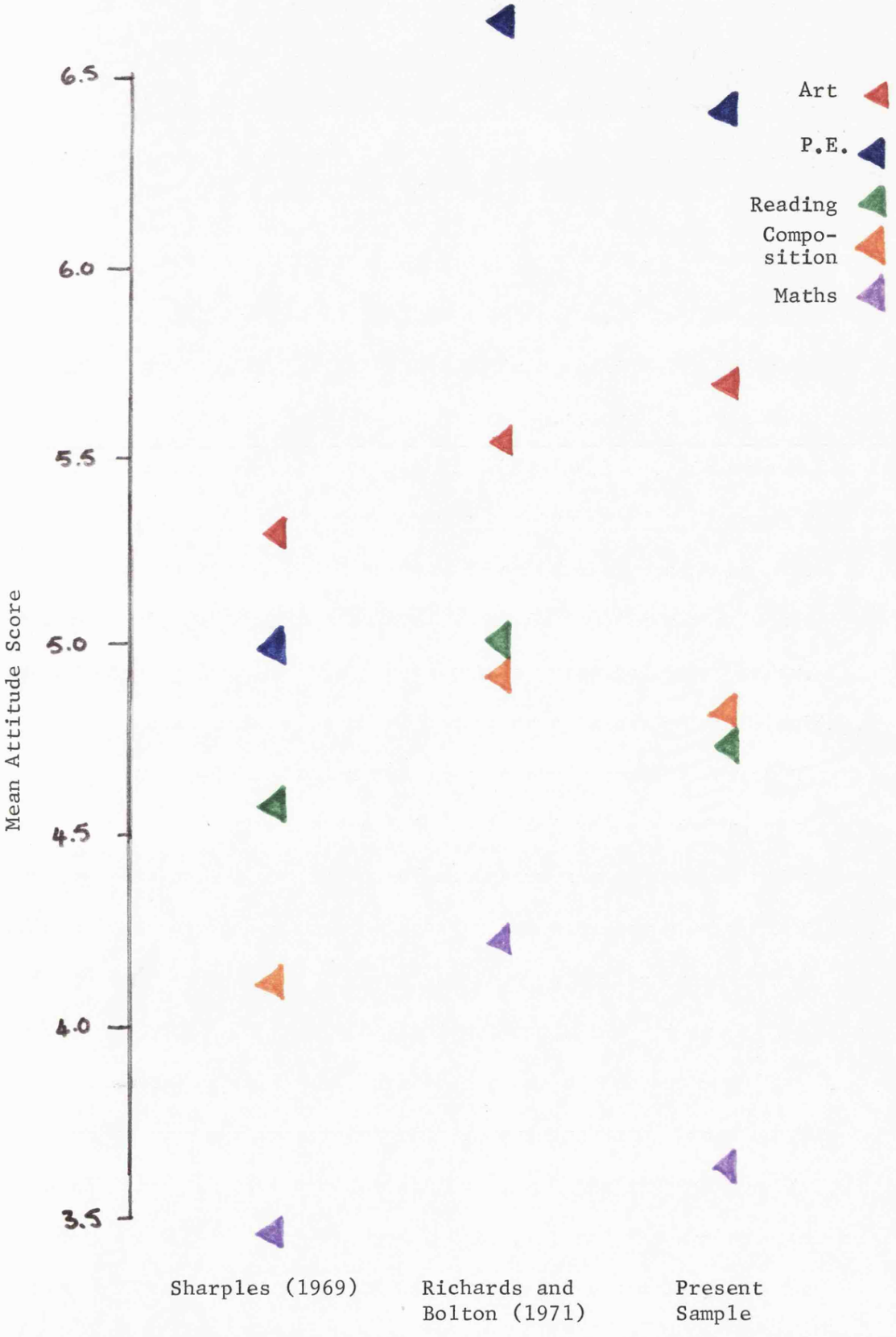
A Guttman (1950) scale constructed by the present writer (Sharples.1969) was used to indicate attitudes towards each of five activities of the Junior School curriculum, Composition, Reading,

Mathematics, P.E., and Art. Reliability data for the test, based on a pilot sample of 620, gave a coefficient of reproducibility of .952 and a minimal marginal reproducibility of .569. These coefficients are within the range suggested by Edwards (1957) as being satisfactory, and previous uses of the test suggest that it provides an instrument which will detect changes in attitude at the Junior stage.

As the test is of recent construction there is little data as to the norms of the scale or its characteristics. Evidence from its limited use to date suggest that it is sensitive to differences between schools and that means for art and p.e. are higher than others, the scores decrease with age, (Sharples,1969. Richards and Bolton,1971.). Figure 4.1 summarises the trends of the means from the two studies cited, together with those of the present sample. The scores yielded by the test are on an eight point scale in the case of each activity. The instrument is presented in appendix. xi.

There are few studies of affective aspects of Junior Schooling, and those reviewed in Chapter two of this study tend to favour the development of instruments specific to individual enquiries, rather than to focus on the production of an instrument of general utility and with adequately described characteristics in terms of reliability, validity and norm data. Amongst the various scales devised for the assessment of children's attitudes towards the climate of schools the ones most thoroughly developed are those of Barker Lunn (1969). Ten Guttman type scales are described, each one being based on data gathered from over 2,000 Junior children. Reliabilities are high, with reproducibility ranging from .90 to .95, and the scales cover a variety of areas of attitudes towards peers, the teacher, and the

Figure 4.1. Means of attitudes to curriculum : present sample compared with other data.



school milieu.

The content of the scales and data of reliability from Barker-Lunn (1969) are summarised below:

		Alpha Coefficients
Attitude towards school	(6 items)	.89
Interest in school work	(5 items)	.88
Importance of doing well	(5 items)	.77
Attitude to class	(8 items)	.91
Other image of class	(6 items)	.69
Conforming V Non-conforming pupils	(4 items)	.90
Relationship with teacher	(5 items)	.82
Anxiety about school work	(6 items)	.80
Social adjustment	(4 items)	.58
Self image	(9 items)	.88

A wide area of affective aspects of schooling is covered by these scales in the compass of a limited range of items designed specifically for the age range under consideration, and the scales were adopted as being suitable for the present study.

The techniques for assessing the reliability of Guttman scales are notoriously time consuming and it was not possible to carry out a scalogram analysis of the results from the present sample. However the published data suggest acceptable levels of consistency. Data of construct validity were given by Barker-Lunn (1969) to indicate the independence of the scales, it was possible to replicate the analysis in the present sample and Table 4.7 indicates the extent to which present results mirror those from the larger sample.

It will be seen that the two sets of results are closely

Table 4.8

Intercorrelation of attitude scales : Attitudes towards school. Data from Barker-Lunn (1969) above the diagonal, (n = 2,087), Data from the present sample below the diagonal, (n = 259), at age 9+.

TEST	1	2	3	4	5	6	7	8	9	10
1. Attitude to school		.71	.44	.40	.21	.37	.39	.15	.09	.20
2. Interest in school work	.63		.45	.43	.23	.38	.43	.16	.13	.25
3. Importance of doing well	.38	.28		.36	.09	.37	.36	.02	.12	.26
4. Attitude to class	.40	.19	.24		.25	.25	.36	.01	.12	.09
5. Other image of class	.35	.27	.16	.31		.14	.20	.14	.10	.09
6. Conforming	.44	.42	.34	.36	.30		.36	.09	.00	.13
7. Relationship with teacher	.38	.67	.27	.40	.00	.48		.24	.21	.42
8. Anxiety in school work	.24	.27	.05	-.01	.20	.02	.36		.23	.40
9. Social adjustment	.06	.12	.06	.02	.43	.15	.12	.08		.29
10. Self image	.19	.39	.27	.45	.12	.15	.41	.09	.04	

comparable and the characteristics reported for the test appear to be supported by present evidence. Barker-Lunn (1968) gives details of means for the scales, however it is not possible to consider these as norms for the scales in the same sense as those given for cognitive tests. The relationships of the test data to normative samples, the distribution of attitudes and the meaning of the descriptive titles of the scales are all less well understood than are similar aspects of attainment and intelligence tests. In so far as the tests will be sensitive to differences between classes and schools, and that scores will vary accordingly, the concept of a 'norm' is not applicable here. In the absence of information about the schools from which the construction data were obtained it is not possible to suggest how closely comparable the means might be with those of the present sample. Table 4.8 shows the manual means together with those from the present investigation, inspection of this shows that the profiles are very closely similar although absolute scores show some slight differences.

A copy of the instrument is presented in the appendix.p. xiii it will be noted that the items of the scales are scrambled and presented in random order, rather than as ten discrete tests.

Table 4.9

Norm data of "Attitude towards school" scales

Scale	Manual data n = 2,087	Present Sample n = 234
1. Attitude to school	3.62	3.01
2. Interest in school work	2.95	3.74
3. Importance of doing well	7.33	6.28
4. Attitude to school	12.53	9.75
5. Other image of class	3.35	2.85
6. Conforming	3.15	2.42
7. Relationship with teacher	2.50	1.77
8. Anxiety in classroom	2.75	2.70
9. Social adjustment	2.36	2.52
10.Self image	9.97	8.82

4.24 School Records

Additional information concerning the sample was available in school records, and these were abstracted wherever it appeared that areas and criteria of assessment were similar between schools. All but one of the schools used the same record cards, and it was possible to identify areas in which the remaining school assessed the children in similar ways. Whilst it was thus possible to gain some general estimates of attainment within schools it became apparent during the study that the data were erratic in availability and quality. Judgements were not related to objective tests but were based on the intuitive judgements of individual teachers and appeared to be affected by a limited range of comment typical of an individual (e.g. one teacher focussing almost exclusively on behaviour, another

on language attainment, and so on). Records of graded estimates on a literal scale shown on the cards were also erratic, provision was made for estimates from A - D to be made in respect of 17 areas of attainment, however once the first estimates were recorded entries in subsequent years showed little variance from the original estimate of 7+, even in such areas as reading where considerable variation might be expected. Further, there was a clear tendency for some schools to grade children consistently high or low in comparison to other schools, despite test evidence of the present study to indicate an absence of such differences. In view of these not uncommon characteristics of the internal records it was considered that the scores could not be used as the basis of a systematic analysis but could only be used to throw a little more light on subsequent discussions of the findings.

4.25 Description of schools

Section 4.1 above indicated that the sample of the investigation was drawn from five schools, and that the results might be examined in relation to between school differences in order to assess the extent to which any observed trends can be attributed to this source of variance. Whilst the relative smallness of the sample precludes a detailed examination of such effects, and whilst the existence of between school variance could be demonstrated irrespective of data concerning the nature of the schools, nevertheless it was considered that a more detailed description of the schools might be useful as a frame of reference when appraising the results. Three techniques were used to describe the schools, and these are discussed below.

Schools Amenities Index (Schools Council 1970) was applied to each school as a checklist against which amenities could be appraised. The index offers 100 items in sections dealing with buildings, entrance areas, room provision, cloakrooms, classrooms, materials, grounds, and staffing; as the original was designed for Infant Schools it was necessary to omit 15 items in the present case. Ratings on the index are expressed as % ratios of the number of amenities absent to the number of amenities observed, high indexes thus indicate poor amenities. Ratings for the schools all fell within the range given as that for Urban schools (Laing.1970,1971). No records of parental occupation were maintained by the schools and attempts to obtain the necessary information did not give rise to satisfactory information. In order to indicate something of the social background of the sample an index of socio-cultural characteristics developed by the present writer (Sharples,1966) following Campbell (1955) was employed. In this index each child indicates the extent to which he could respond verbally to a number of culturally loaded subjects e.g. "Going to my music lessons", "Television after nine-o'clock". Scoring is effected by awarding +2 for a high response to positive items, that is expressing a favoured activity, through to -2 for a high response to a negative item. Resulting scores are distributed around zero, in order to produce positive scores a constant of 20 is added to each score. Theindex was normed on 324 children aged 8-10, and gave a normal distribution of scores, mean = 20.86, SD = 5.57, mean item validity coefficient r = .468. The index, together with the scoring key and item validities is presented in appendix.p. xii Thirdly, in order to gain insight into the general character of each school, and to

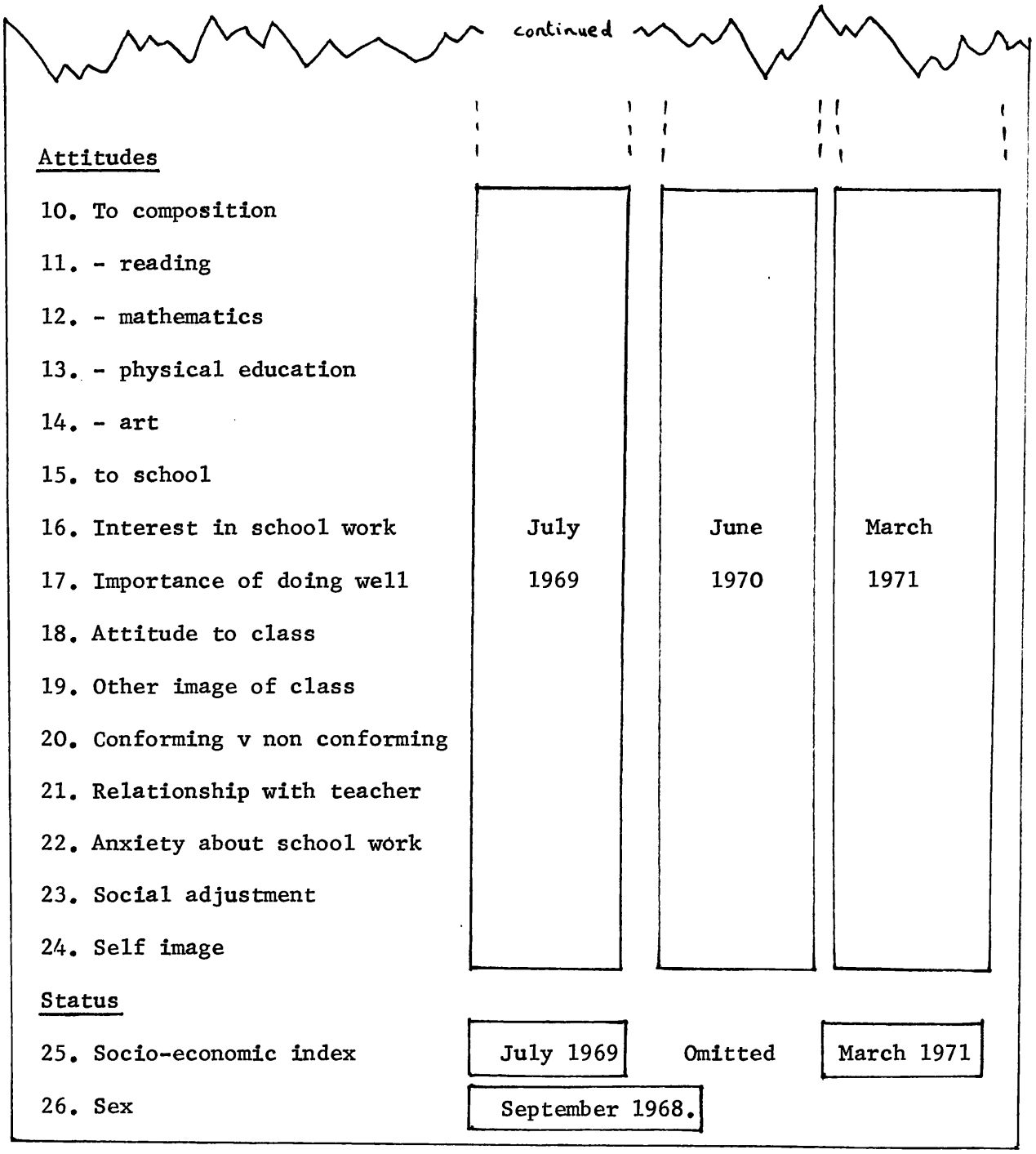
make contact with the children in the sample, each class was taught by the investigator for one session each week for a period of a term in their fourth junior year, at age 10+. Topics covered in the teaching ranged over a wide area of the curriculum and were quite independent of the survey materials.

4.3 Procedure

The foregoing sections have described the sample of the investigation and summarised the instruments used over a three year period to measure personality attainment and attitudes amongst Junior children. Freyberg (1968) has demonstrated a relationship between test mean scores and the stage of the school year at which tests are administered. In the present study tests were conducted at the same time within each academic year, as far as was possible. The table below summarises the variables of the investigation and indicates the dates during which the children completed the relevant material.

Variable	Dates of test completion		
Personality. J.E.P.I.			
1. Extraversion	July 1969	July 1970	March 1971
2. Neuroticism			
Attainment. France Wiseman 1A, 2A, 3A.	Age 8+	Age 9+	Age 10+
3. Spelling	November/ December 1968	November/ December 1969	November/ December 1970
4. Reading			
5. Number			
6. Comprehension			
7. Verbal R.			
8. Numberical Problem Solving			
9. Non Verbal Reasoning	Omitted		

continued



It will be noted that two tests were omitted on different occasions. The spatial reasoning test was not available in 1968 and was not included in the battery until 1969: the socio-cultural measure is an index of status and repetitions were not called for, however, to check on the reliability of the instrument in terms of its stability a repeat test was given two years after the first, for this variable the mean of the two tests was used in the description and analysis.

With these exceptions scores were obtained for each of the 234

children in respect of each of the 25 tests of the battery each year at age 8+, 9+, and 10+. In all cases the investigator conducted the testing sessions in order to ensure uniformity of presentation between schools. The tests were completed without time limits, but in a series of sessions of 30 - 40 minutes, in the children's own classrooms and places so as to disturb normal routines as little as possible. Safeguards were taken against cheating and copying as far as was possible. The children were carefully supervised by two adults, and questions concerning the tests and the modes of answering were answered individually when problems of procedure arose. The children were assured that their own answers were sought, that the tests were not in any way a part of the assessment procedures of the school or of secondary school selection, but that their best efforts would increase the usefulness of the information which was to be used in a study of "how different children answer questions differently". In the attitude and personality tests the children were assured that their papers would not be seen by the teachers and that individual answers would remain quite confidential.

The completed tests were scored, and normed where required, following the procedures described earlier. Complete data were obtained for the majority of the children, but in some cases absence during a testing session reduced an individual's data by a small number of items. Where this occurred regression equations were set up to predict scores, using the data available from previous testing of the sample on the same or parallel materials, as described in 4.1 above. Table 4.10 presents the regression constants and beta weights for each test between the successive years. As

Table 4.10. Regression equations for predicted scores. (y = ax + b)

TEST	y=9+score		x=8+score	y=10+score		x=9+score
	a	b	% predicted	a	b	% predicted
Neuroticism	.56	5.80	2.99	.54	6.00	5.13
Extraversion	.52	8.19	2.99	.54	8.49	5.13
Spelling	.93	1.52	0.43	.70	12.34	.43
Reading	.75	13.89	1.28	.63	20.12	2.14
Number	.84	4.45	2.37	.69	10.46	3.42
Comprehension	.72	12.64	1.43	.86	8.71	0.43
Verbal Reasoning	.46	25.35	1.43	.39	24.79	0.85
Num. problems	.67	9.77	5.98	.75	10.60	6.84
Non Verbal R.	-	-	-	.50	22.86	0.00
Attitudes to Composition	.24	3.39	15.81	.44	2.83	5.56
Reading	.16	4.10	15.81	.35	3.26	5.56
Maths	.23	2.74	15.81	.27	2.96	5.56
P.E.	.81	1.22	15.81	.22	4.52	5.56
Art	.65	1.57	15.81	.35	4.07	5.56
Attitudes to school	.40	1.89	8.12	.60	1.60	7.69
interest in school	.30	1.90	8.12	.46	1.45	7.69
imp. doing well	.35	3.95	8.12	.31	4.41	7.69
Attitudes to class	.16	8.72	8.12	.33	7.33	7.69
other image	.14	2.52	8.12	.48	1.56	7.69
conforming	.33	1.53	8.12	.49	1.09	7.69
Relation with teacher	.34	1.07	8.12	.34	1.13	7.69
Anxiety	.44	1.63	8.12	.44	1.50	7.69
Adjustment	.28	1.84	8.12	.33	2.05	7.69
Self Image	.05	8.64	8.12	.63	3.69	7.69

was indicated in section 4.1 this procedure was only carried out where less than 10% of the data were incomplete, the number of children whose scores were supplemented by predictions of the kind described is also indicated in table 4.10.

4.4 Analysis

4.41 Description

For each class group, in respect of each variable at each age level, means and standard deviations were calculated to facilitate a description of the relative standing of the class groups both between themselves and with normative data. Differences between classes were located by one way analysis of variance, where 'F' tests proved significant at or beyond the 5% level Duncan's (1953) multiple range test, as extended by Kramer (1956) and described by Edwards (1960), was employed to test differences between pairs of means. The results are presented in chapter 5 following.

4.42 Analysis

Relationships between personality variables and various measures of cognitive and affective aspects of schooling, for girls and boys separately and overall, were hypothesised in chapter three. These hypotheses were examined by analysis of variance, analysis of covariance, and chi-square.

As described in section 4.21 above the personality measures were used as a basis of division into a 3x3 matrix, locating groups of high, average and low neuroticism in relation to

extraversion, ambiversion and introversion. As far as was possible the sample was divided, irrespective of sex, into three equal groups on each dimension at each age level, it was not possible to locate cutting points which achieved this exactly however and in each case there was a slight departure from equality in the sub-groupings. In order to indicate the extent of this divergence chi-square calculations were carried out to show how far the actual division into three groups varied from a division into equal thirds. The extent to which these divisions held good for separate sexes was also checked by chi-square. The 3x3 matrix of personality measures at each age level was also checked for each sex and overall by chi-square. Table 4.11 presents the chi-square values obtained in these checks.

It will be seen from the table that the division into categories was satisfactorily achieved without undue distortion except in the case of the boys at age 10+, where there was a trend, significant at the 1% level, for the boys to group in high extraversion-low neuroticism, and in low extraversion-high neuroticism.

A three way analysis of variance was performed in respect of each variable at each stage of the investigation, to indicate the variance arising from sex differences and the two personality dimensions under consideration. Edward's (1967) solution for unequal cells by the unweighted means method was employed. In this solution the analysis of variance of all effects is carried out using cell means only, as if with one observation per cell, the correction term being derived from the total sum of scores. Error sums of squares are calculated from the entire data and are subsequently corrected by division by the harmonic mean (n_h) of

Table 4.11 Distribution of sample in personality categories

Age 8+

Extraversion Score	Neuroticism Low 0-11	Average 12-15	High 16+	Total
High 18+	33	25	27	85
Average 15-17	32	26	23	81
Low 0-14	24	24	20	68
Total	89	75	70	234

Group	df	chi-squared	p
Girls only	4	2.007	.30
Boys only	4	3.858	.20
Extraversion groups	2	2.158	.30
Neuroticism groups	2	2.394	.30
Total	4	.767	.50

Age 9+

Extraversion Score	Neuroticism Low 0-10	Average 11-16	High 17+	Total
High 19+	33	30	20	83
Average 16-18	19	30	24	73
Low 0-15	24	26	28	78
Total	76	86	72	234

Group	df	chi-squared	p
Girls only	4	6.908	.10
Boys only	4	7.071	.10
Extraversion groups	2	.644	.70
Neuroticism groups	2	1.297	.50
Total	4	4.964	.30

Age 10+

Extraversion Score	Neuroticism: Low 0-10	Average 11-15	High 16+	Total
High 20+	31	29	16	76
Average 17-19	22	23	28	73
Low 0-16	22	27	36	85
Total	75	79	80	234

Group	df	chi-squared	p
Girls only	4	1.180	.80
Boys only	4	12.953	.01
Extraversion groups	2	.972	.50
Neuroticism groups	2	.103	.95
Total	4	9.409	.05

the matrix cells. This technique produces a proportional reduction in the denominator of the 'F' ratios based on effect mean squares / error mean squares. Dayton (1970) describes a related but slightly less elegant solution involving a similar correction applied to effects sums of squares rather than error mean squares. However this would involve seven corrections in each calculation in the present case and would of course produce exactly the same results as by the alternative method involving only one correction. Resulting 'F' ratios are inevitably slightly distorted but present an acceptably close solution to the problem of unequal cells without discarding data. The nature of this approximation is borne in mind in subsequent analysis of the results. Where significant effects or interactions were identified further analyses, using Duncan's test, were carried out to identify personality, school or class groups which might be associated with the trends concerned.

Further analyses were conducted to examine the data of successive years of the investigation. In these, analysis of covariance was employed, again using an unweighted means solution suggested by Dayton (1970). Attainment means were adjusted in respect of the scores on the previous year's scores on the parallel test. This was carried out between each consecutive pair of attainment tests. Again multiple range tests were carried out to evaluate differences between adjusted group means.

To check on the independence of the attainment data from associations with intelligence, it was ascertained at each stage the extent to which the personality 3x3 matrix was so related,

and where necessary adjustments were made by appropriate co-variance techniques described above.

The results of these analyses are presented in chapter six and are discussed in chapter seven. All calculations involved were carried out on programmable desk calculators using programmes based on the analysis principles described above and written in machine code for the present study by the investigator.

Chapter 5.
The Schools.

5.1 Differences between schools : descriptions

In order to appraise the nature of the results which follow it is important to have some insight into the schools from which the data arose, and to be aware of the differences between the various classes in their attainment and attitudes in school. As was described earlier each school was visited over a period of time and systematic observations were made of the amenities and social setting of the school.

The initial analysis of the results of the investigation concerning attainment and attitudes were conducted in terms of the nine classes of children concerned, and it is possible to present these results together with more impressionistic material in order to give an overall picture of the sample.

It could not be said that the schools represented a wide range of primary school tradition and practice. Whilst they varied widely in size and organization they were nevertheless similar in methods of teaching and general climate. None of the schools could be said to be especially formal, rigid or authoritarian, and similarly none could be said to be especially experimental, individual or flexible in method.

The following notes describe the schools in a series of short sketches.

School A. is a two class entry Junior School. An urban school it is accommodated in a modern building with hall, extensive play areas, staff room, good cloakrooms, large classrooms with access to project areas and a library, the amenities index rating was 8.75. The catchment area is suburban / urban fringe, the majority of children

coming from skilled and semi-professional backgrounds, the socio cultural index mean score was 20.28.

Classes in the school are organised in parallel age groups, with the exception of some less able children being extracted for remedial work. Yearly promotions of the children do not disturb the groupings, but teachers are changed at year end. Of the two classes sampled one had an undisturbed progress, the other experienced some disturbance in the second year when a number of teachers were in charge of the class during a period of staffing difficulties. As a result this class appeared to be less settled and cohesive than the other.

School B. is a suburban school in a dormitory village. Accommodation is not good, being in a mid 19th century building on a difficult site for extension. Classrooms have been rendered more light and are of a fair size although cloakroom and service space is very restricted, the amenities rating was 28.75. The catchment area includes housing of a wide variety and some rural areas also, the socio cultural index mean score was 20.35.

Numbers permit only three junior classes, promotion being based on ability as assessed by teachers. All children commence in the first and finish in the third class but movement between depends upon numbers, available space and the estimates of the children's abilities. Three teachers and the head teacher taught the sample at one or other time during the study, and only in the final year were they together in one class, and then as a group of 13 in a class of 31.

School C. is in a commuter village, considerably smaller than that of School B. Accommodation is in a single hall divided by a wooden

partition, with 'lean to' kitchens, cloakrooms and toilets. Amenities were least highly rated here, the index rating being 38.75. Catchment is from predominantly middle class homes, the socio cultural index mean score being 21.58.

Because of restricted size and accommodation organization is in two classes only, with all children of Junior age being in one class, the class teacher remaining unchanged throughout the period of the experiment.

School D. is in a small town, on three sides surrounded by new housing but looking on open country. Accommodation is modern and includes generously equipped teaching spaces, hall, project areas, staff rooms, kitchens and large playing fields. School Amenity index was 6.25, indicating the best accommodation amongst the five schools. The catchment area is largely dormitory residence with new private housing and a little local council and rural housing included, parental occupations were largely lower professional and managerial, socio cultural mean score was 19.83.

The school was organised in parallel classes at the commencement of the study, with eight classes in all. At third and fourth year levels an experiment in grouping was introduced, and the present sample was included in a larger group with a team of three teachers for the third and fourth years, at age 9+ and 10+. The sample retained something of their identity as their teacher at 8+ remained with them as a tutor, but they were taught largely on a 'set' basis for basic skills during the last two years in school.

School E. is a town school, housed in the building of an erstwhile secondary school. Facilities were good, although one class was in rather dilapidated temporary accommodation and classrooms were not

large or so well equipped as in Schools A, B and D. The amenity rating was 17.5.

The area is mainly residential, but with a rather poorer general level of property and maintenance than in the areas of the other schools, the socio cultural index mean was 20.22.

This was a large school, with four parallel classes, unstreamed, in each age group. There was a remedial group, which from time to time drew children from the sample age group, however the sample was restricted to those in the sample age group at Sept. 1. 1968, and wherever possible less able children were included in the survey. There was some setting for mathematics, and class teachers changed at each year end.

5.2 Differences between schools : diagrams

The attainment and attitude scores of the children in the nine classes were examined by analysis of variance in order to detect any differences between the sample schools. Tables 5.1 to 5.24 show diagrams of the means of the classes in respect of each variable at each age level, and give an indication of the overall mean and SD. Where F tests were significant this is indicated in the diagrams. Details of the data giving rise to these tables are presented in the statistical appendix. Tables 1 to 62

The following key is used throughout the tables:

△ indicates a significant F ratio amongst column means.

CLASS A_1 ——— CLASS A_2 – – – –

CLASS B ———

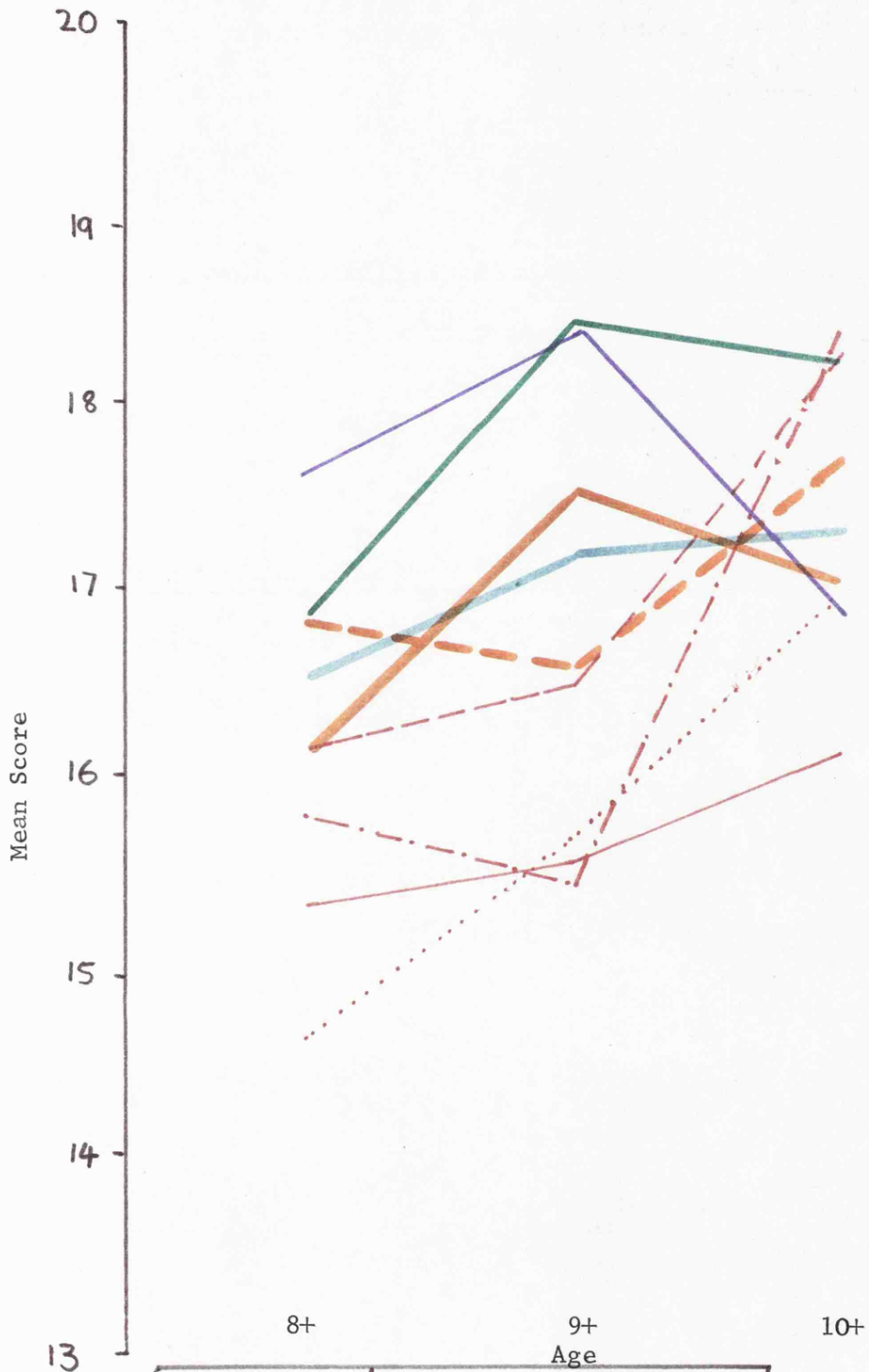
CLASS C ———

CLASS D ———

CLASS E_1 ——— CLASS E_2 – – – – CLASS E_3 – · – · – CLASS E_4 ·····

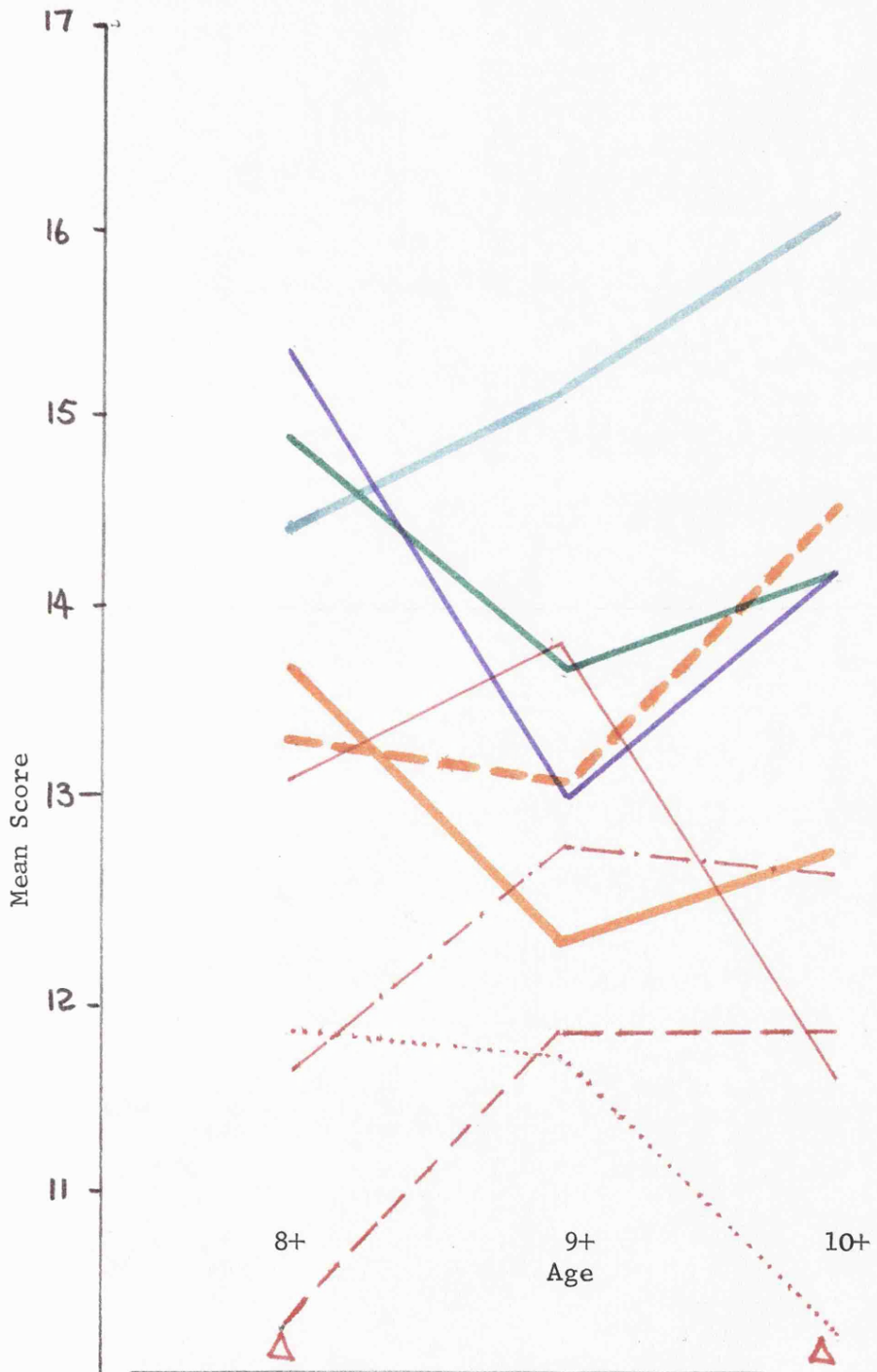
n = 234 throughout.

Table 5.1. Diagram of means of classes : extraversion.



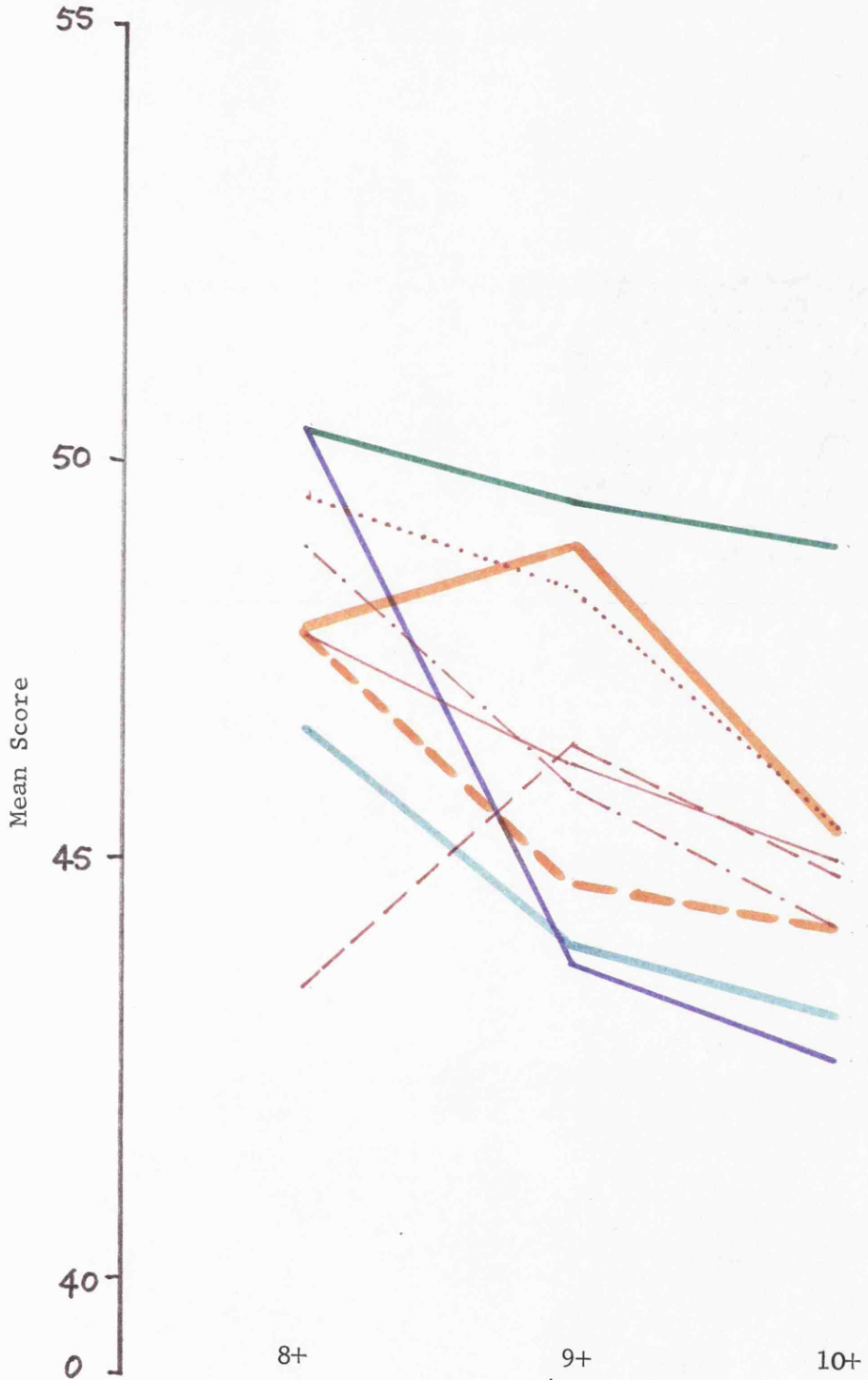
Year	8+	9+	10+
$\bar{x}$ overall	16.03	16.55	17.42
SD overall	3.64	3.56	3.73

Table 5.2. Diagram of means of classes : neuroticism.



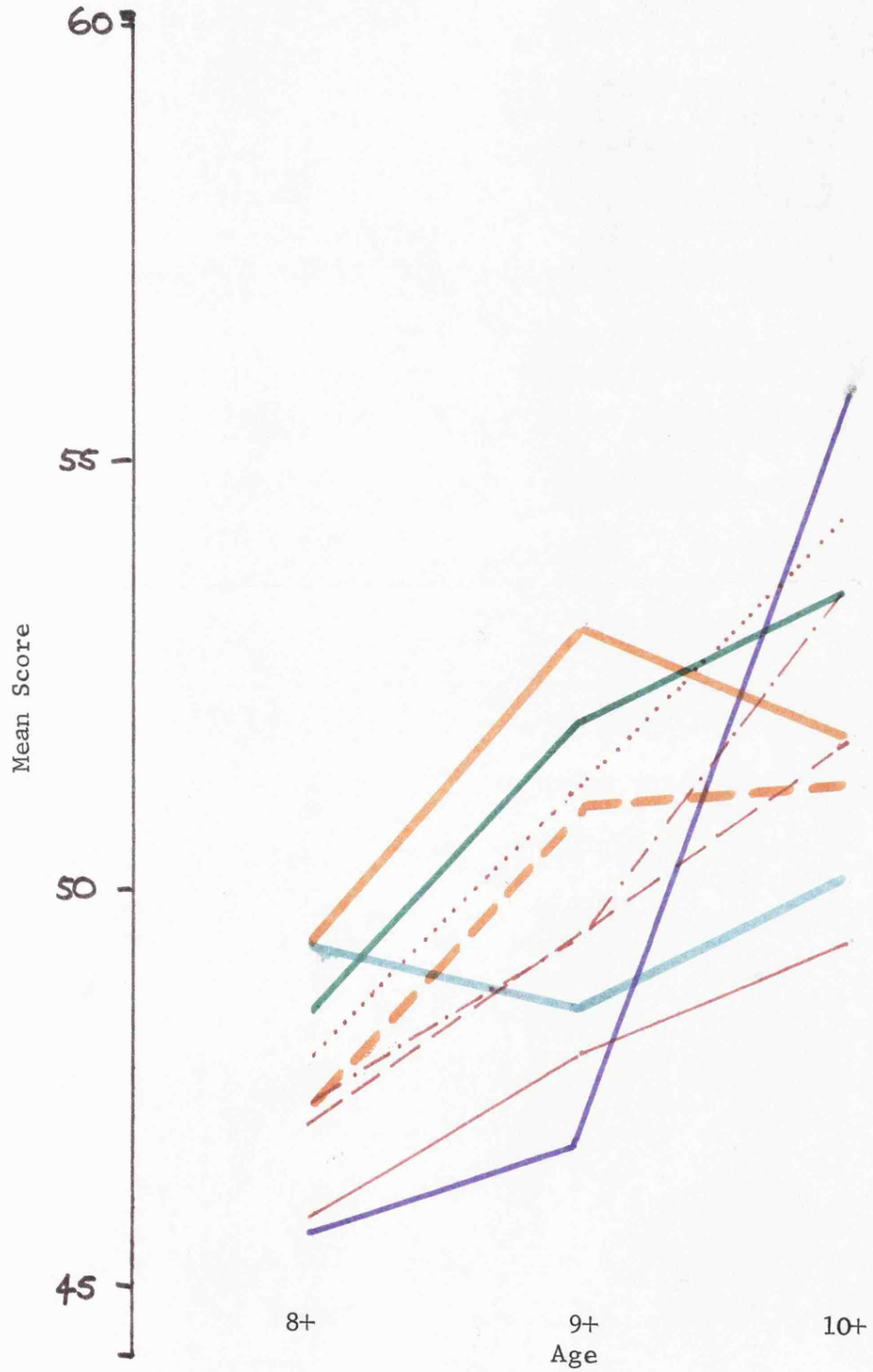
Year	8+	9+	10+
$\bar{x}$ overall	12.89	13.07	13.03
SD overall	4.70	5.10	5.02

Table 5.3. Diagram of means of classes : spelling.



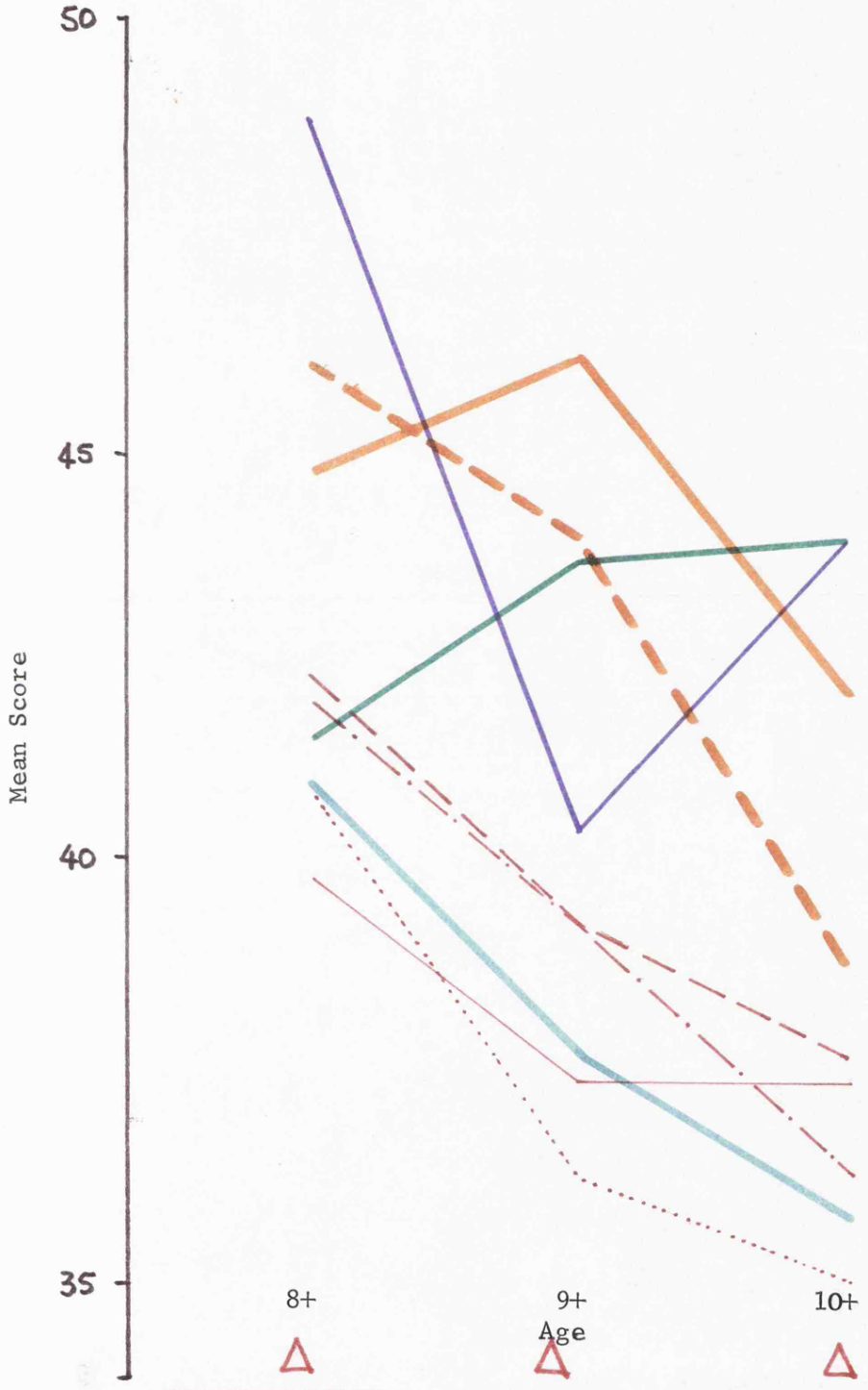
Year	8+	9+	10+
$\bar{x}$ overall	48.21	46.37	44.75
SD overall	8.66	9.51	8.03

Table 5.4. Diagram of means of classes : reading.



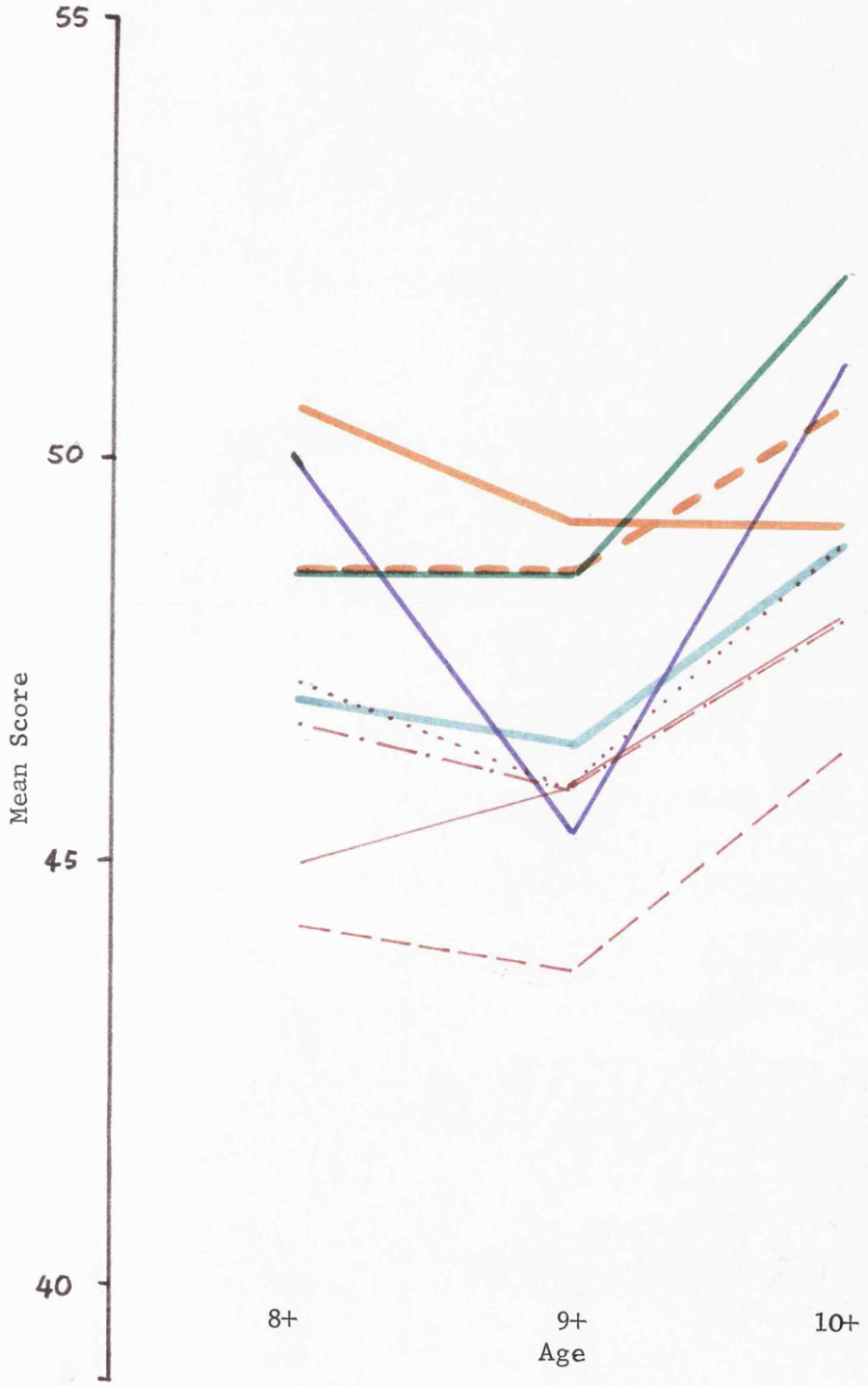
Year	8+	9+	10+
$\bar{x}$ overall	47.69	49.53	51.64
SD overall	9.49	10.36	8.96

Table 5.5 Diagram of means of classes : number.



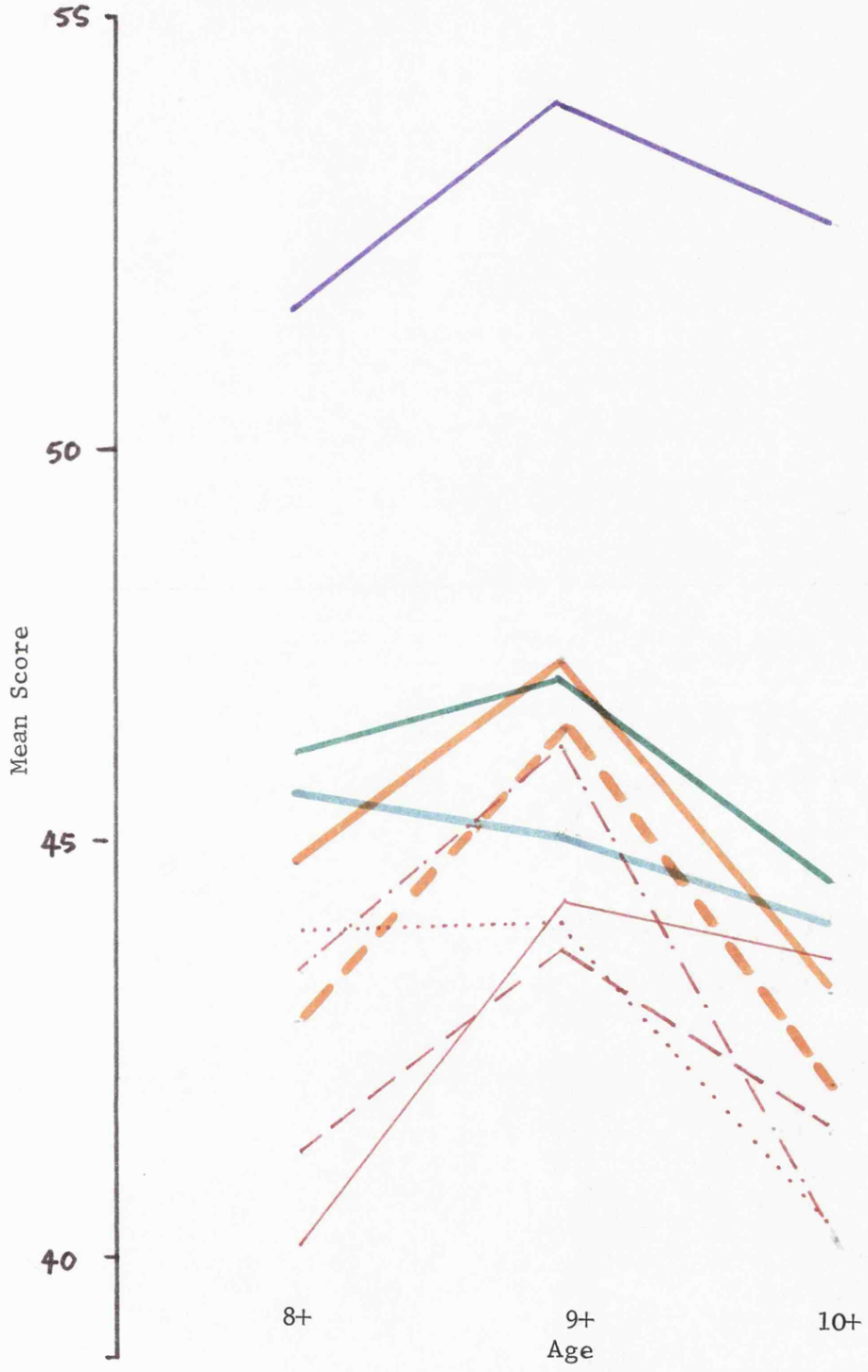
Year	8+	9+	10+
$\bar{x}$ overall	42.17	40.05	37.98
SD overall	6.24	7.80	6.88

Table 5.6. Diagram of means of classes : comprehension



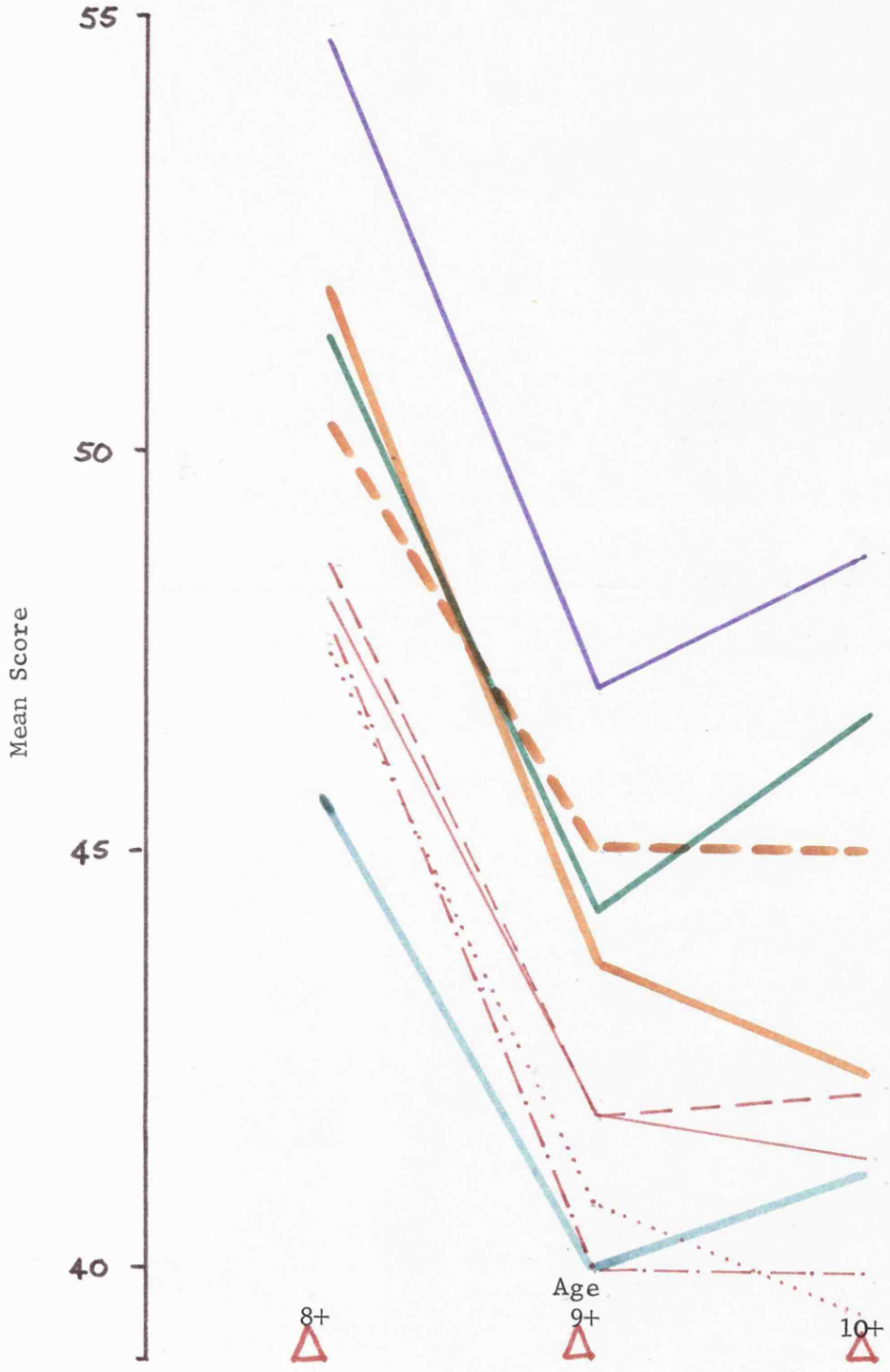
Year	8+	9+	10+
$\bar{x}$ overall	47.18	46.68	48.79
SD overall	8.29	7.88	8.85

Table 5.7. Diagram of means of classes : verbal reasoning



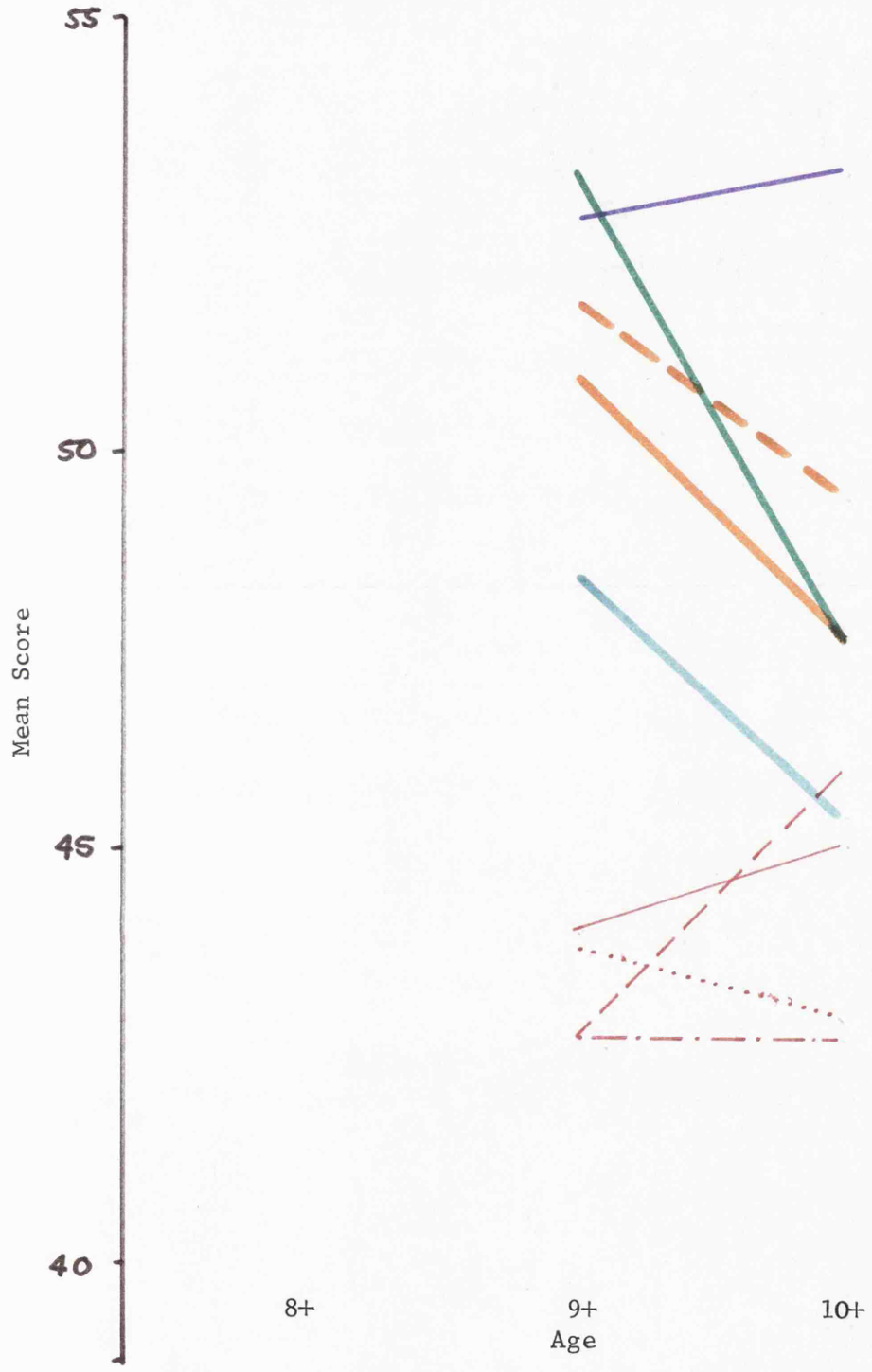
Year	8+	9+	10+
$\bar{x}$ overall	43.64	45.62	42.67
SD overall	8.91	8.56	8.23

Table 5.8. Diagram of means of classes : numerical problems.



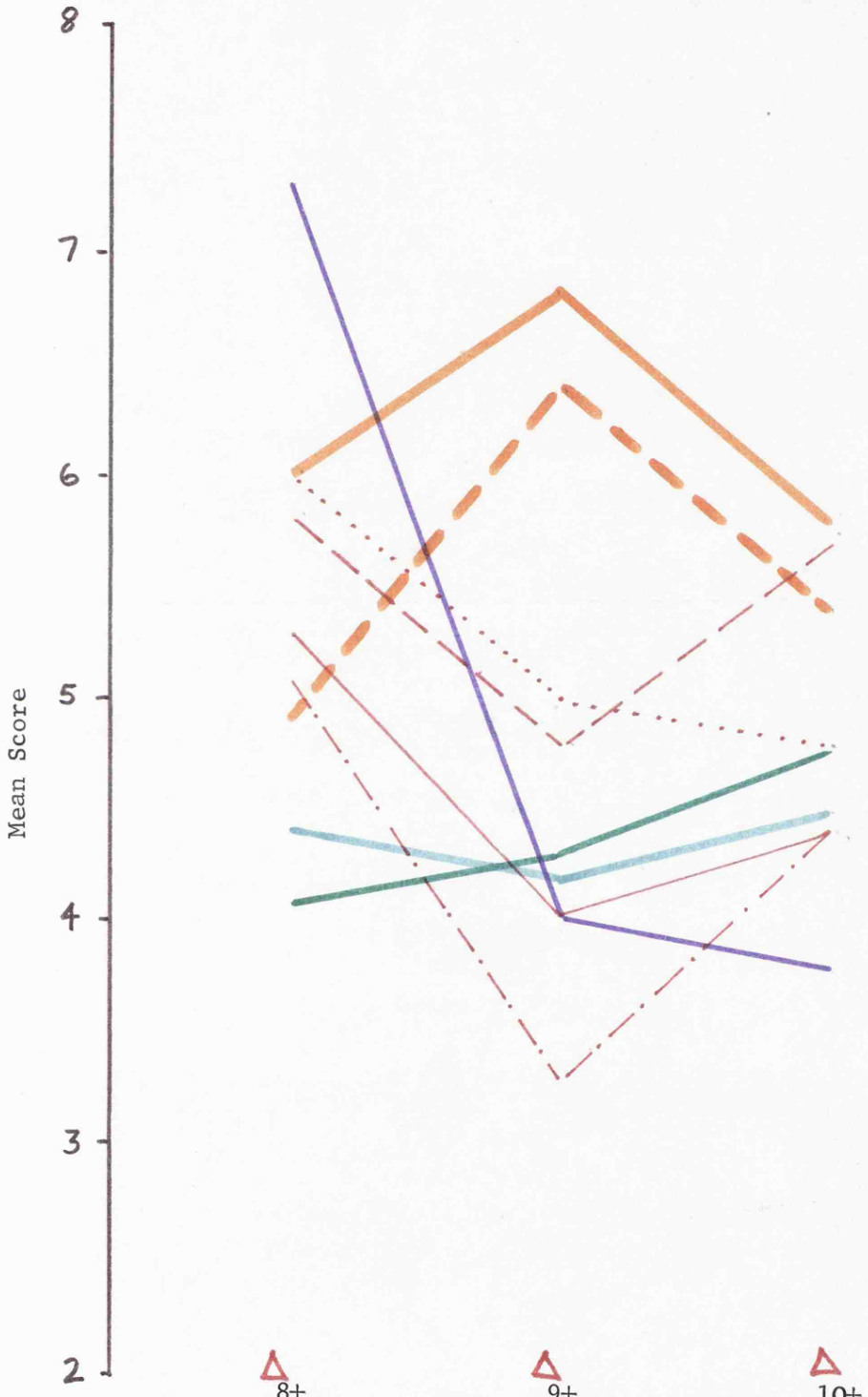
Year	8+	9+	10+
$\bar{x}$ overall	48.79	42.18	42.18
SD overall	7.98	6.94	6.86

Table 5.9. Diagram of means of classes : spatial reasoning



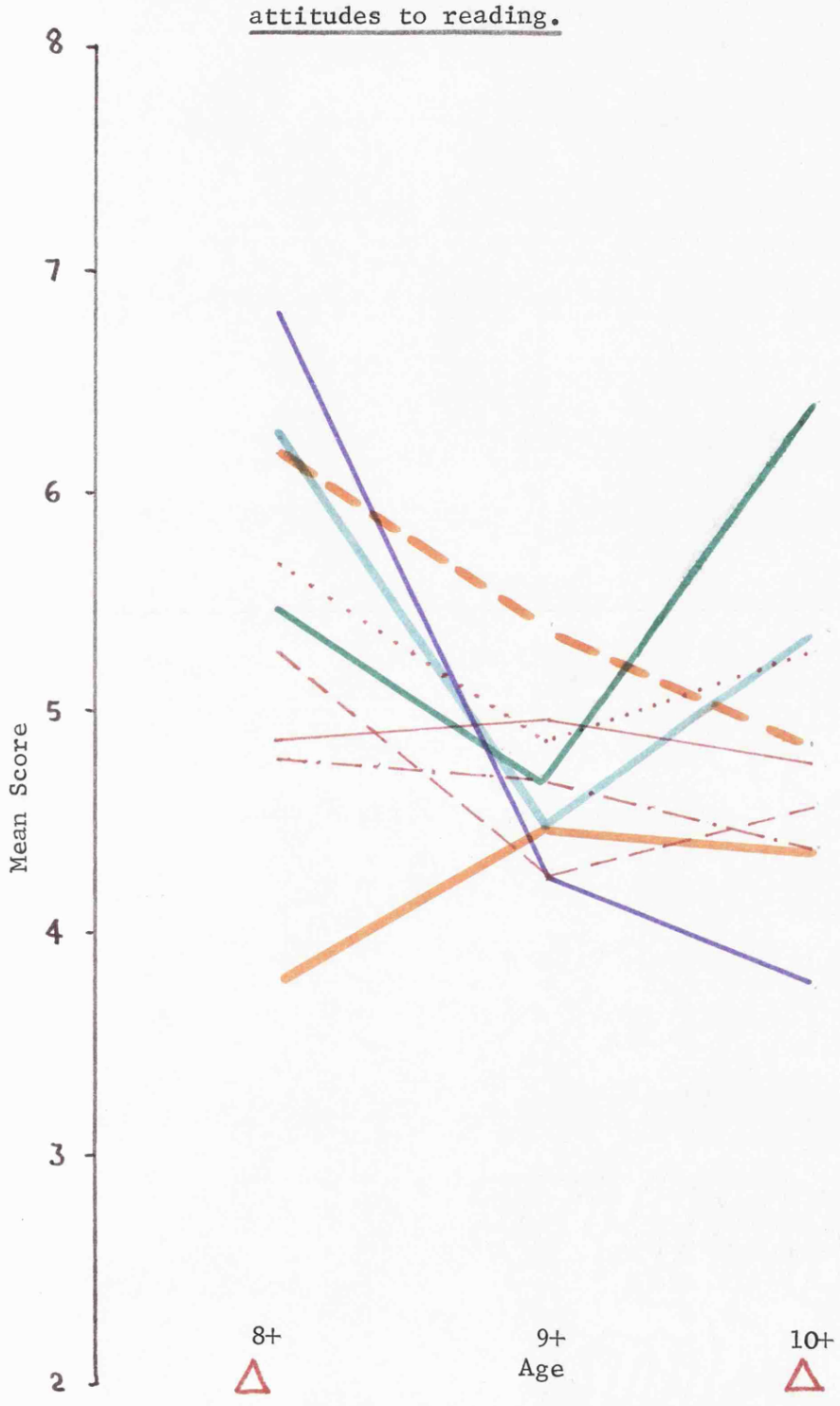
Year	8+	9+	10+
$\bar{x}$ overall	-	46.66	45.94
SD overall	-	8.71	8.39

Table 5.10. Diagram of means of classes : attitude to composition



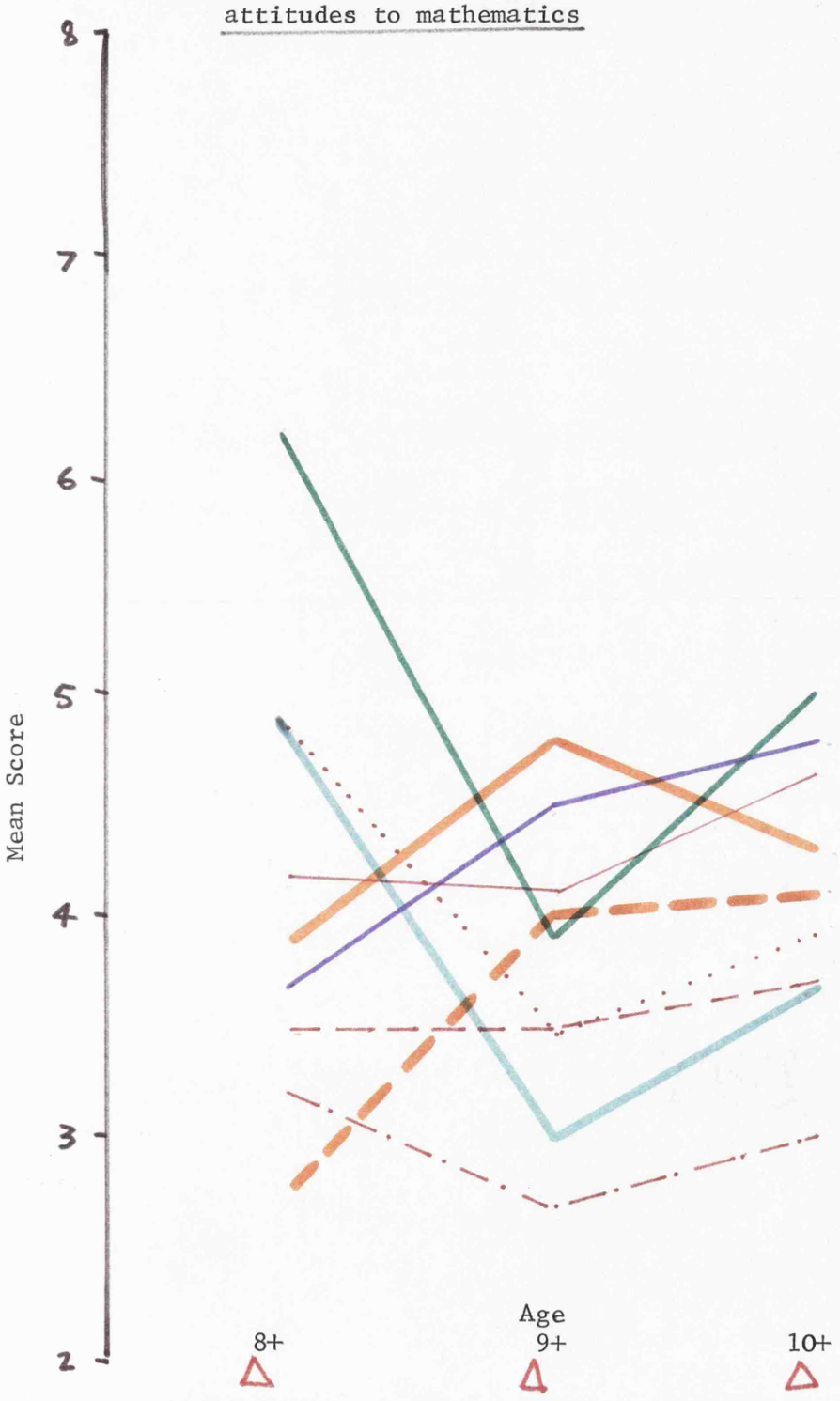
Year	8+	9+	10+
$\bar{x}$ overall	5.33	4.87	4.96
SD overall	2.21	2.14	2.06

Table 5.11. Differences between means of classes : attitudes to reading.



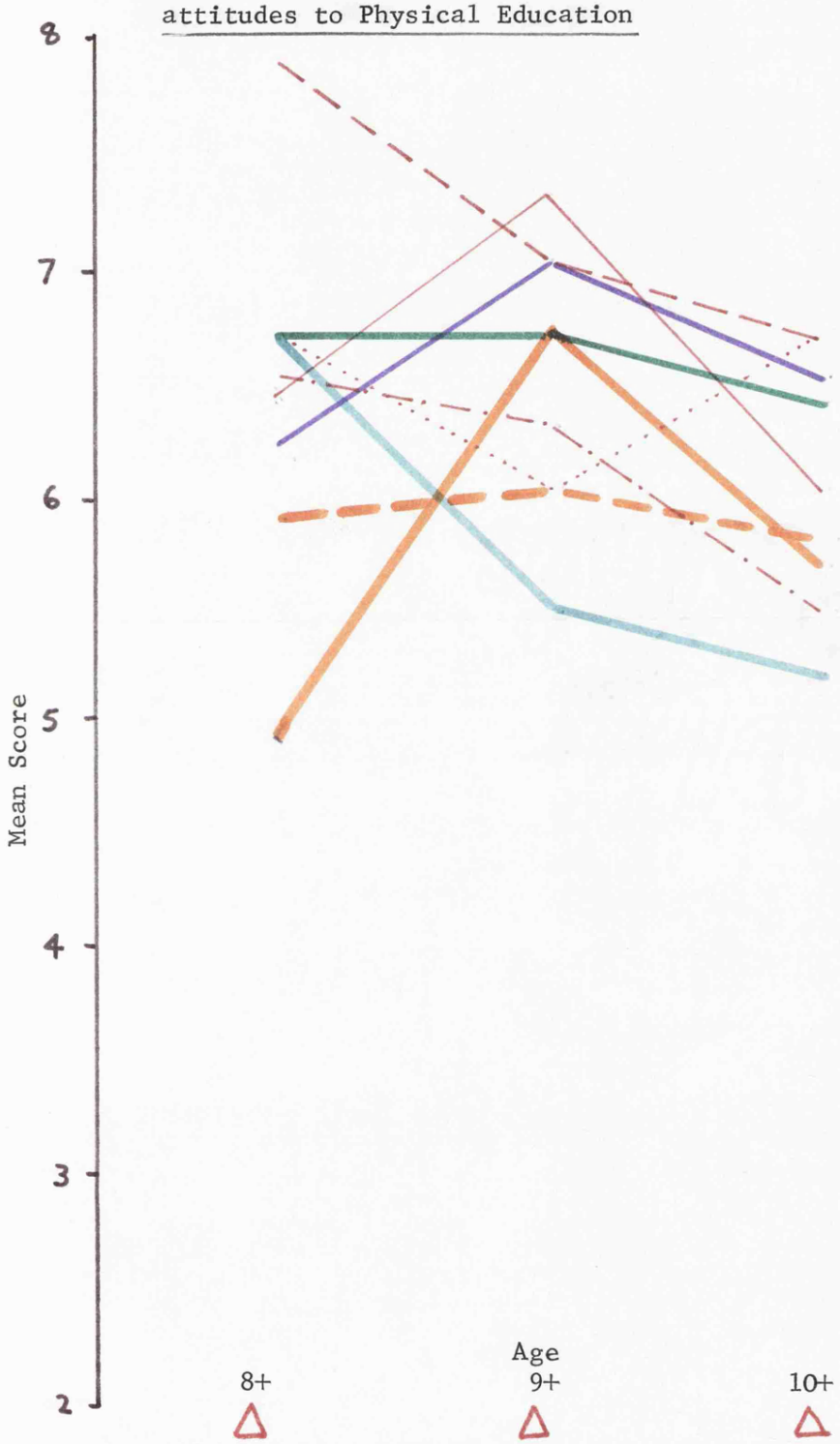
Year	8+	9+	10+
$\bar{x}$ overall	5.38	4.75	4.90
SD overall	2.16	2.09	1.95

Table 5.12. Differences between means of classes : attitudes to mathematics



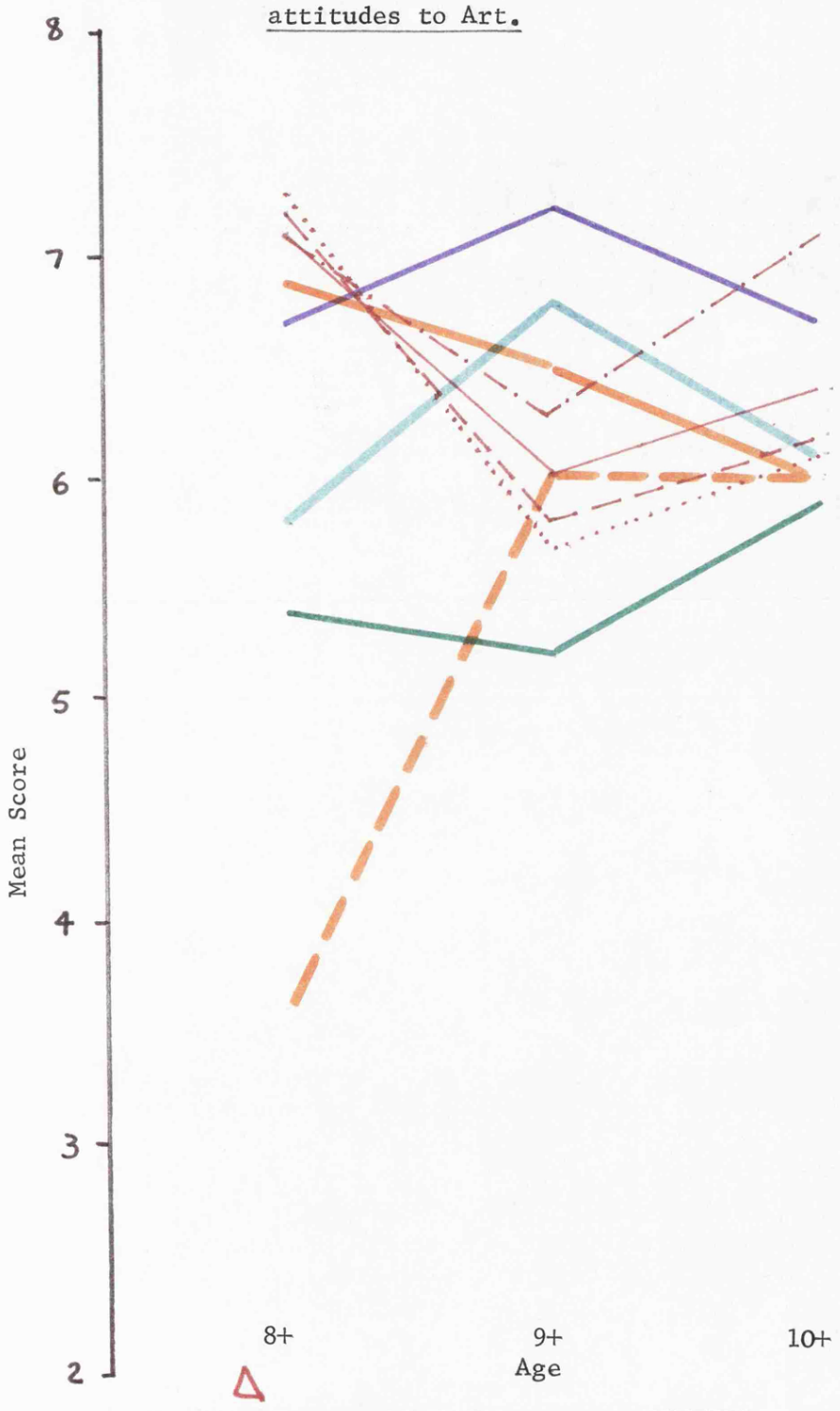
Year	8+	9+	10+
$\bar{x}$ overall	4.28	3.68	3.94
SD overall	2.03	2.05	1.90

Table 5.13. Differences between means of classes : attitudes to Physical Education



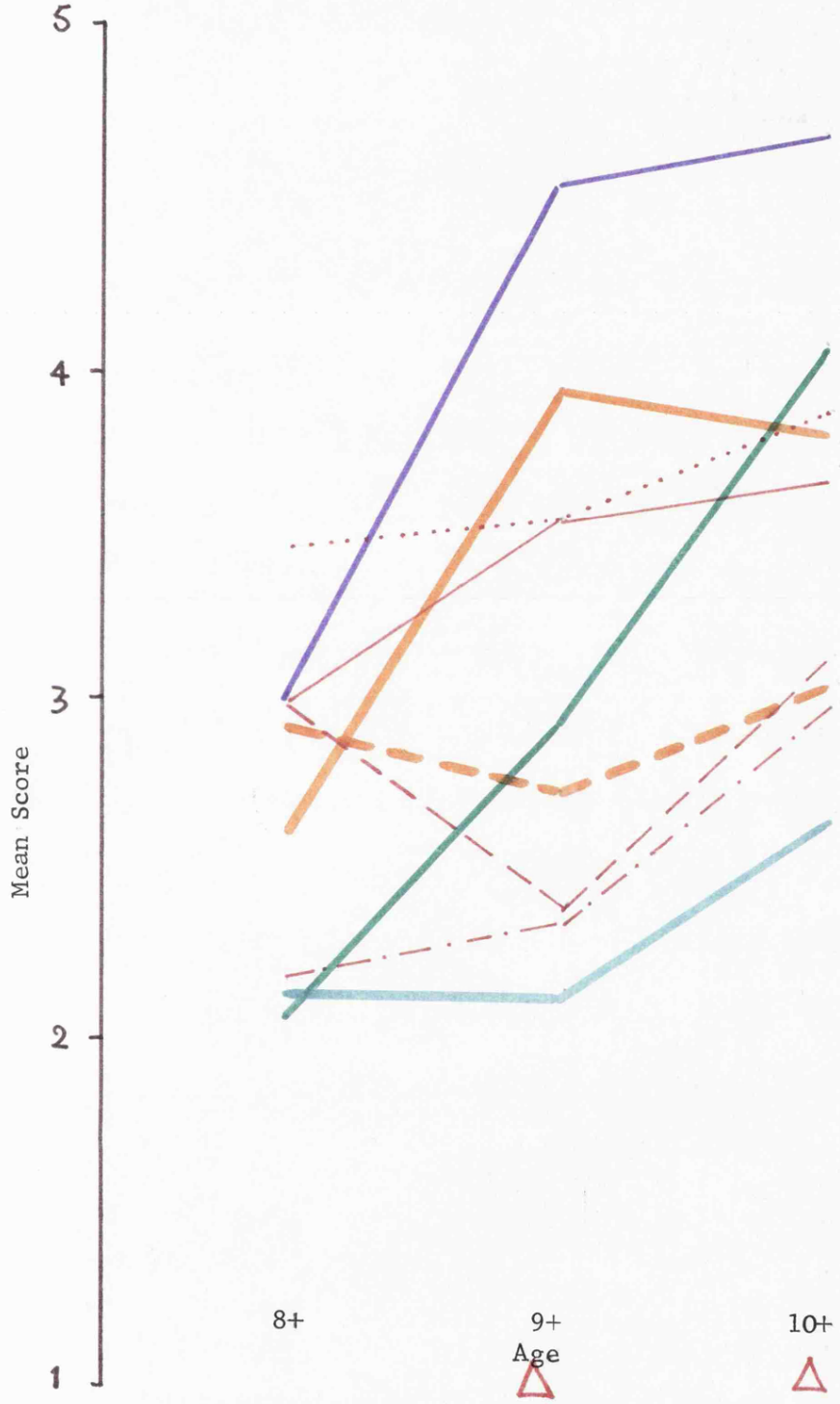
Year	8+	9+	10+
$\bar{x}$ overall	6.46	6.43	5.95
SD overall	2.05	1.87	1.89

Table 5.14. Differences between means of classes : attitudes to Art.



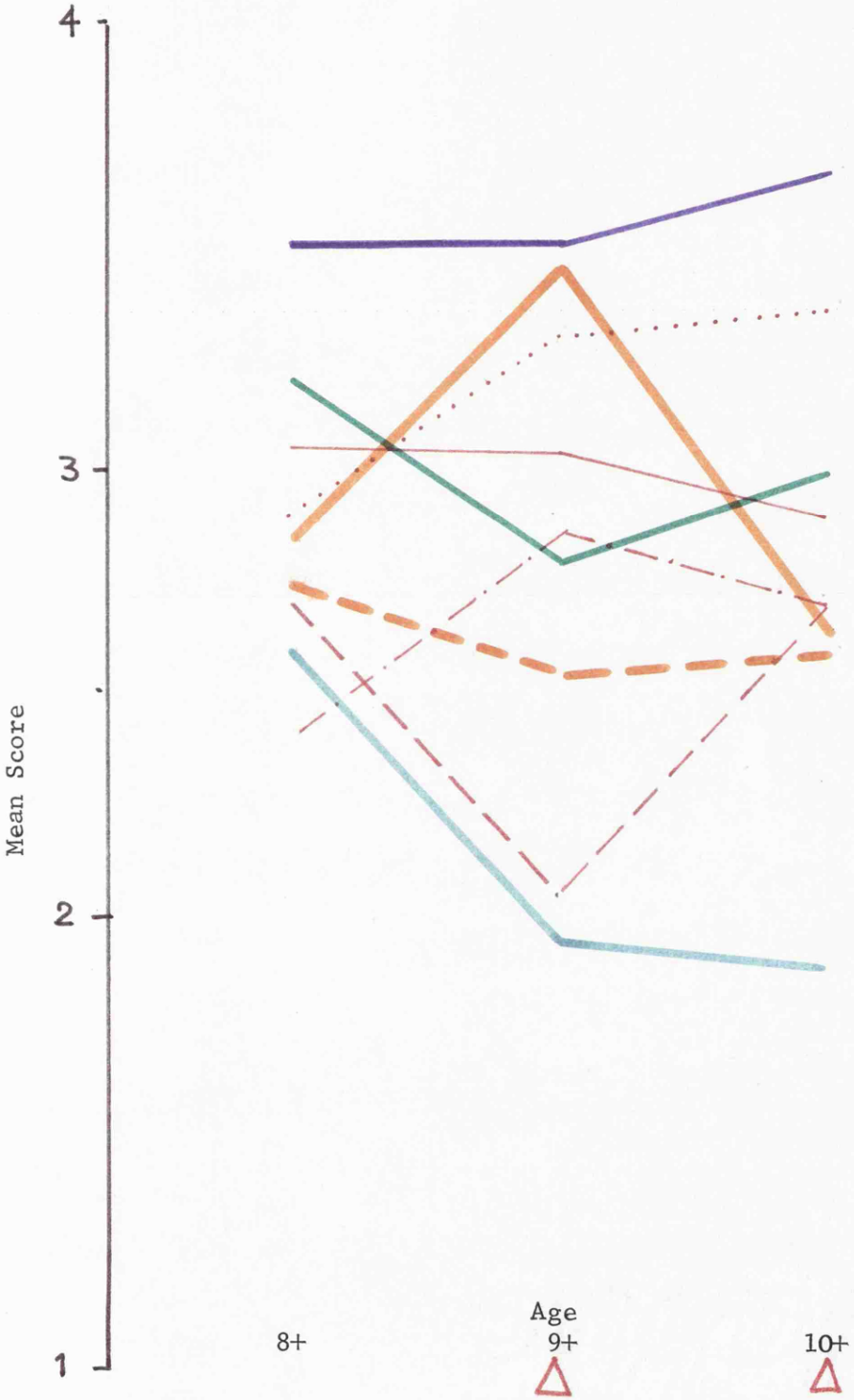
Year	8+	9+	10+
$\bar{x}$ overall	6.34	5.72	6.24
SD overall	2.20	2.08	1.78

Table 5.15. Diagram of means of classes : attitude to school



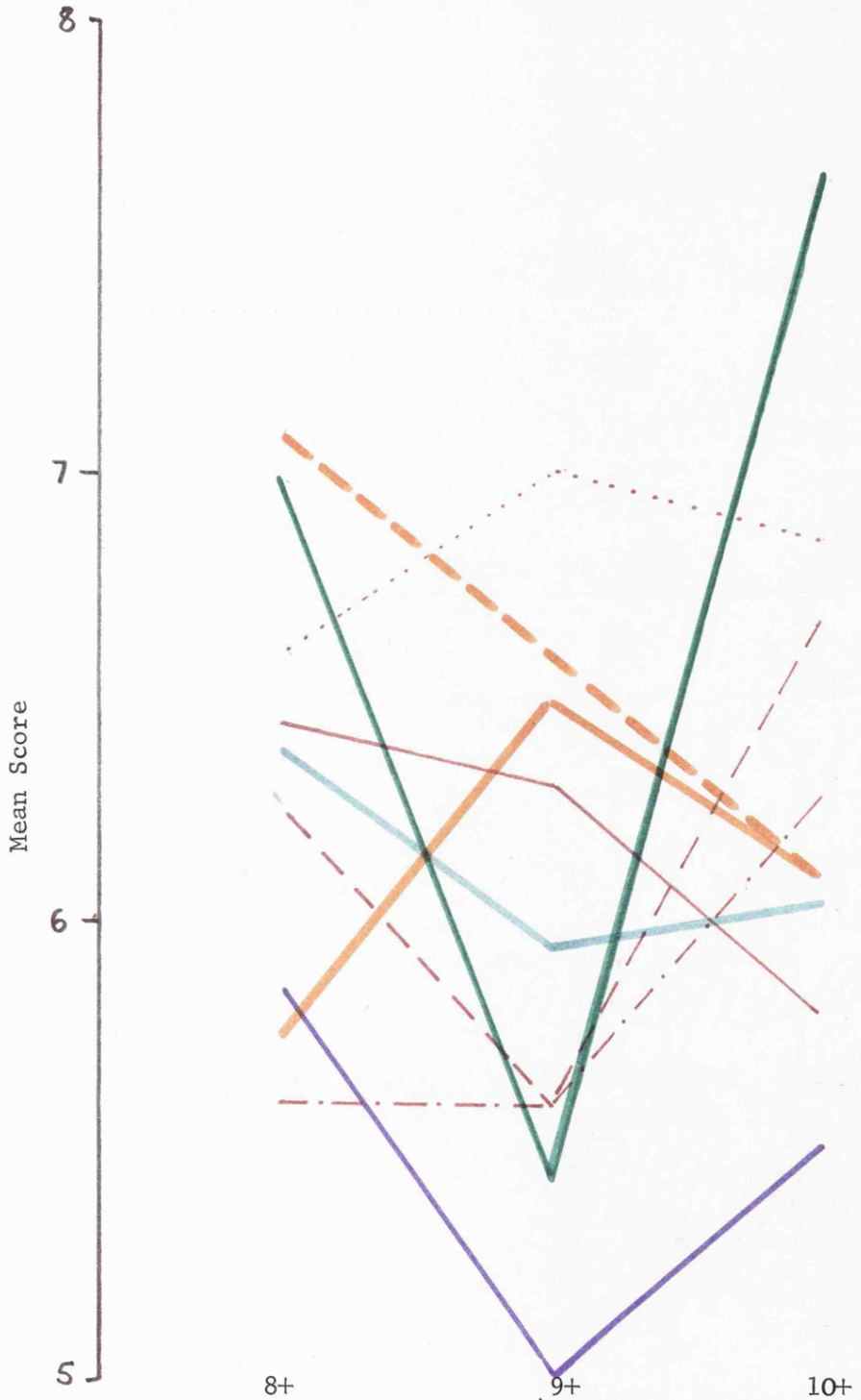
Year	8+	9+	10+
$\bar{x}$ overall	2.71	2.96	3.36
SD overall	2.02	1.81	1.79

Table 5.16. Diagram of means of classes : interest in school.



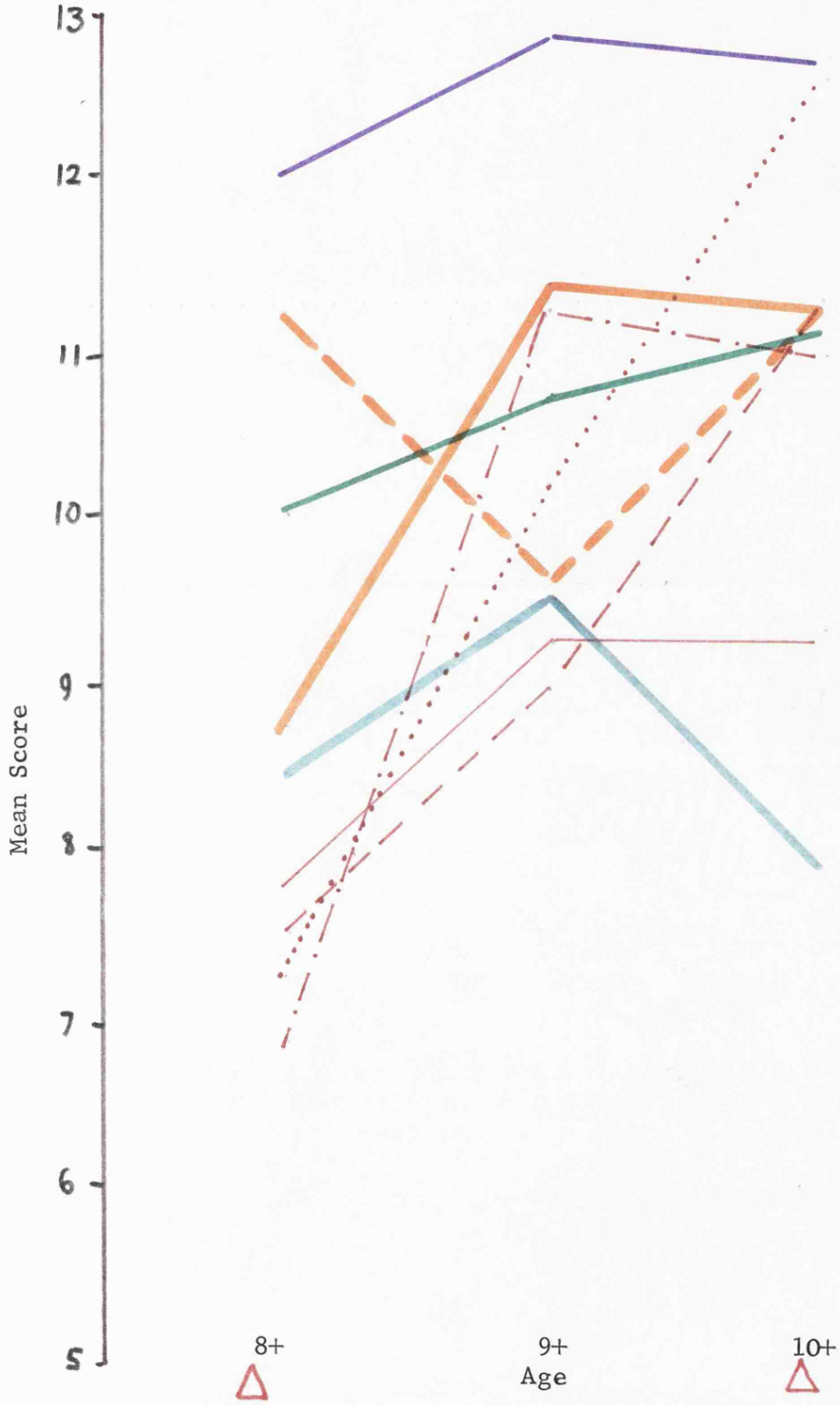
Year	8+	9+	10+
$\bar{x}$ overall	2.79	2.73	2.70
SD overall	1.68	1.57	1.52

Table 5.17. Diagram of means of classes : importance of doing well.



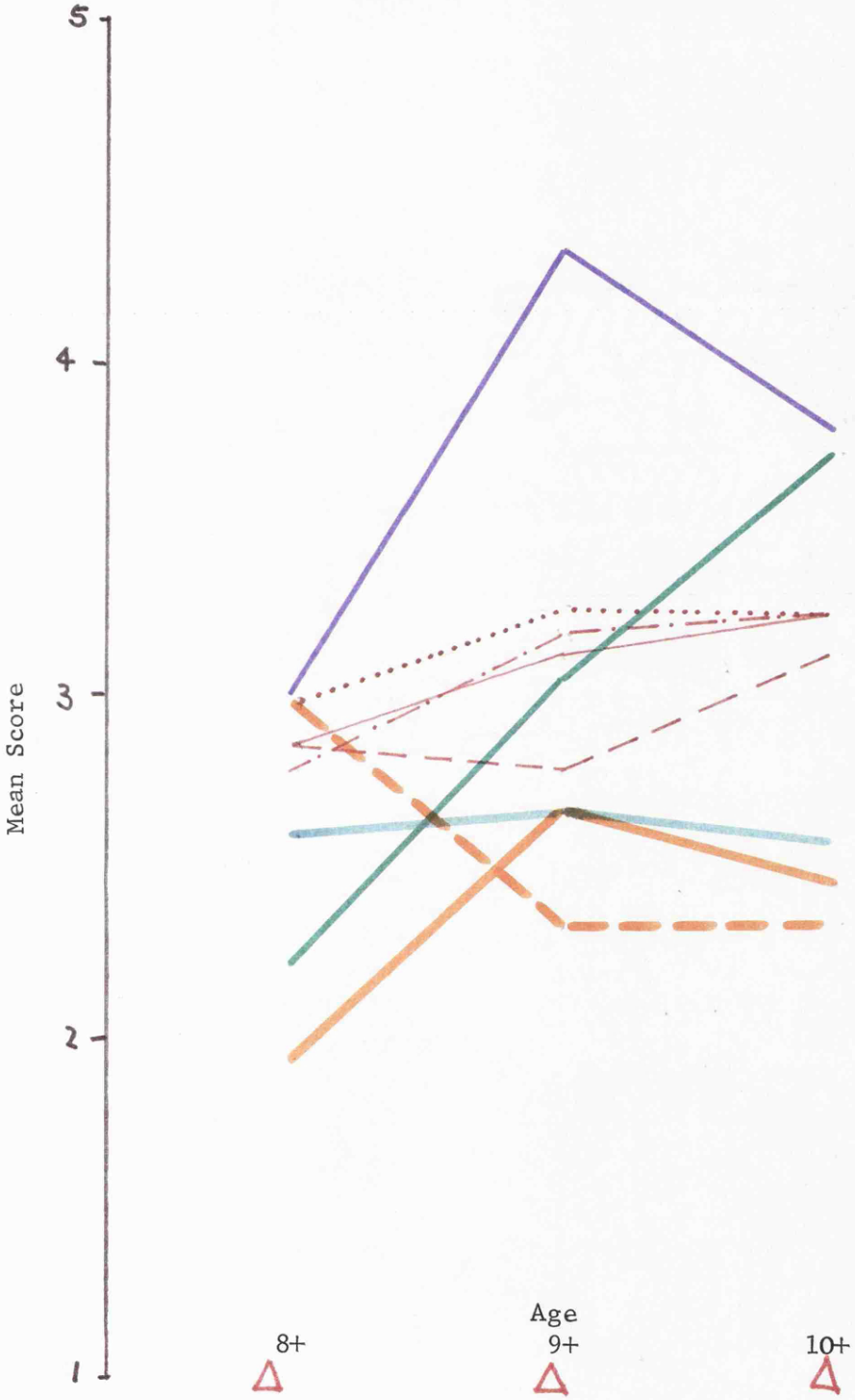
Year	8+	9+	10+
$\bar{x}$ overall	6.34	6.15	6.35
SD overall	2.26	2.19	1.97

Table 5.18. Diagram of means of classes : attitude to class.



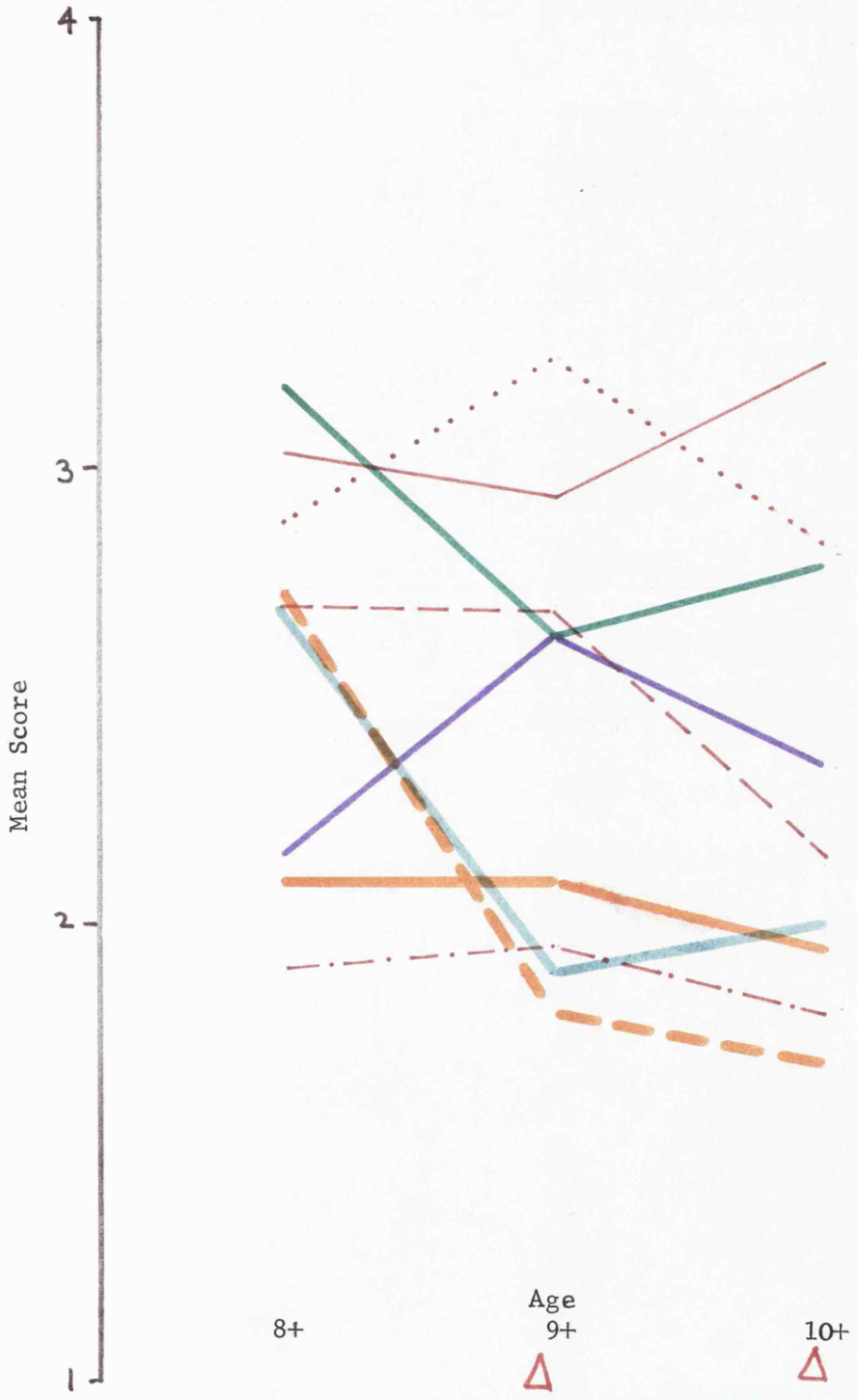
Year	8+	9+	10+
$\bar{x}$ overall	8.50	10.11	10.64
SD overall	3.81	4.24	3.99

Table 5.19. Diagram of means of classes : 'other' image of class.



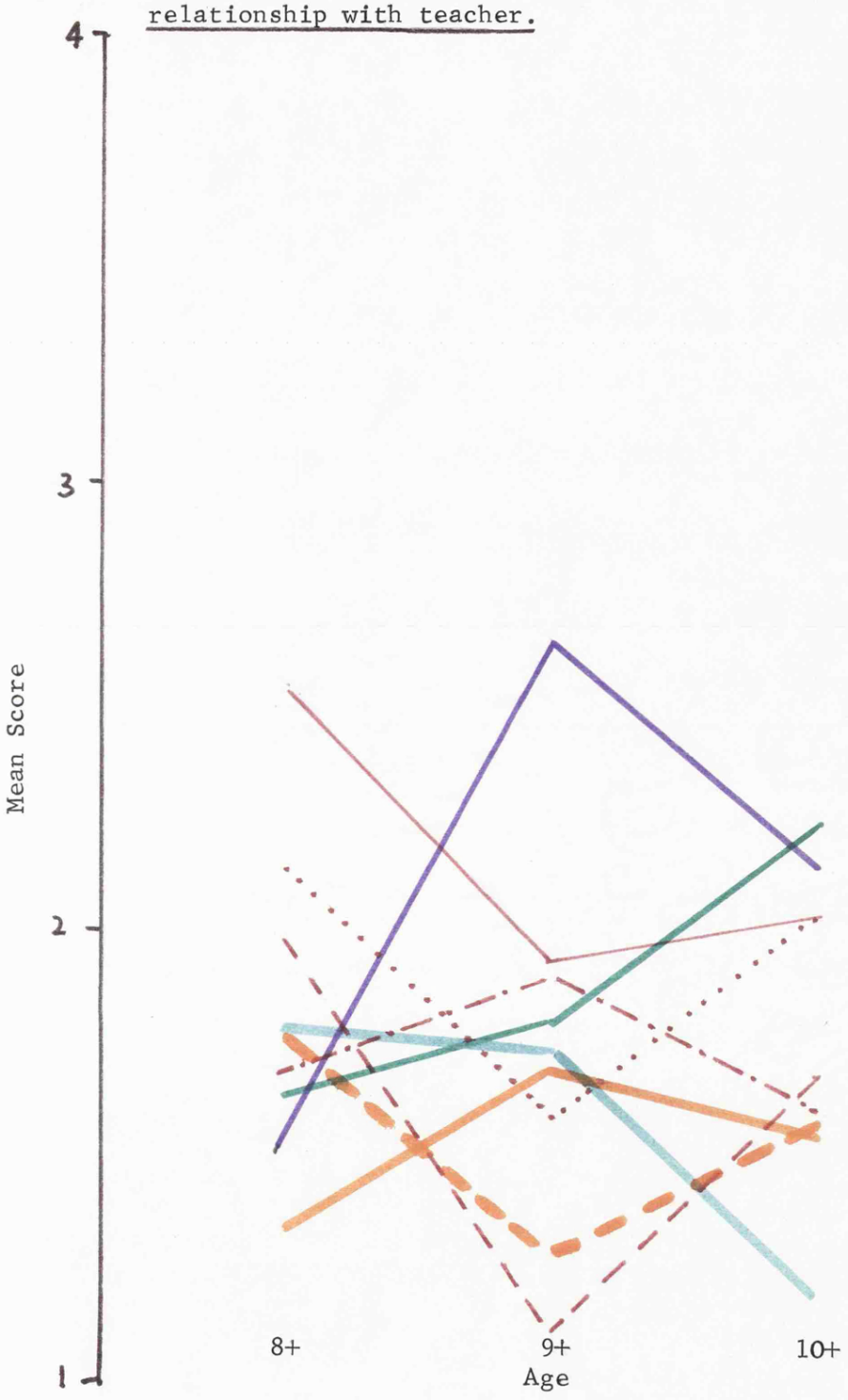
Year	8+	9+	10+
$\bar{x}$ overall	2.69	2.91	2.96
SD overall	1.32	1.30	1.33

Table 5.20. Diagram of means of classes : conforming v non conforming.



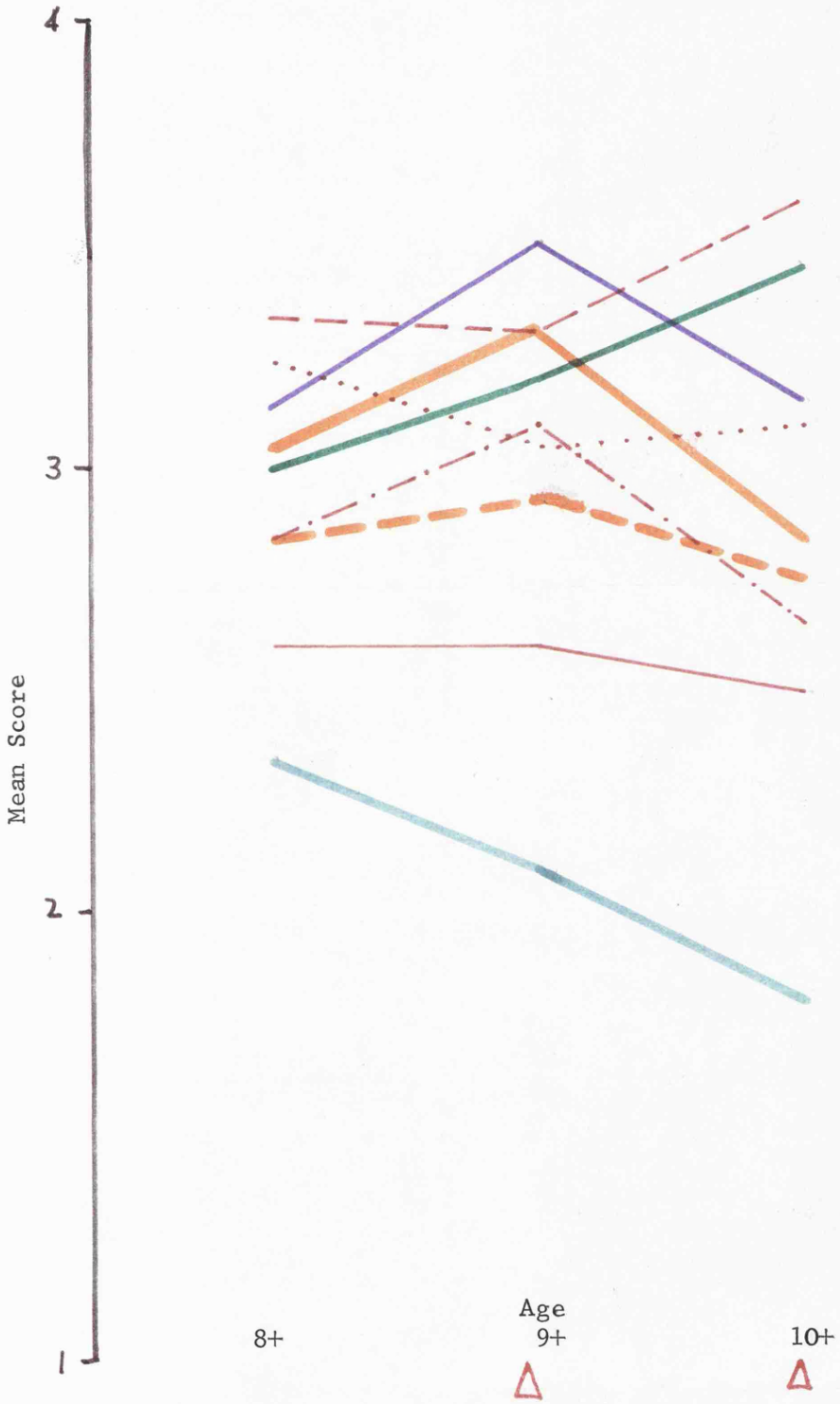
Year	8+	9+	10+
$\bar{x}$ overall	2.61	2.39	2.26
SD overall	1.63	1.38	1.36

Table 5.21. Diagram of means of classes : relationship with teacher.



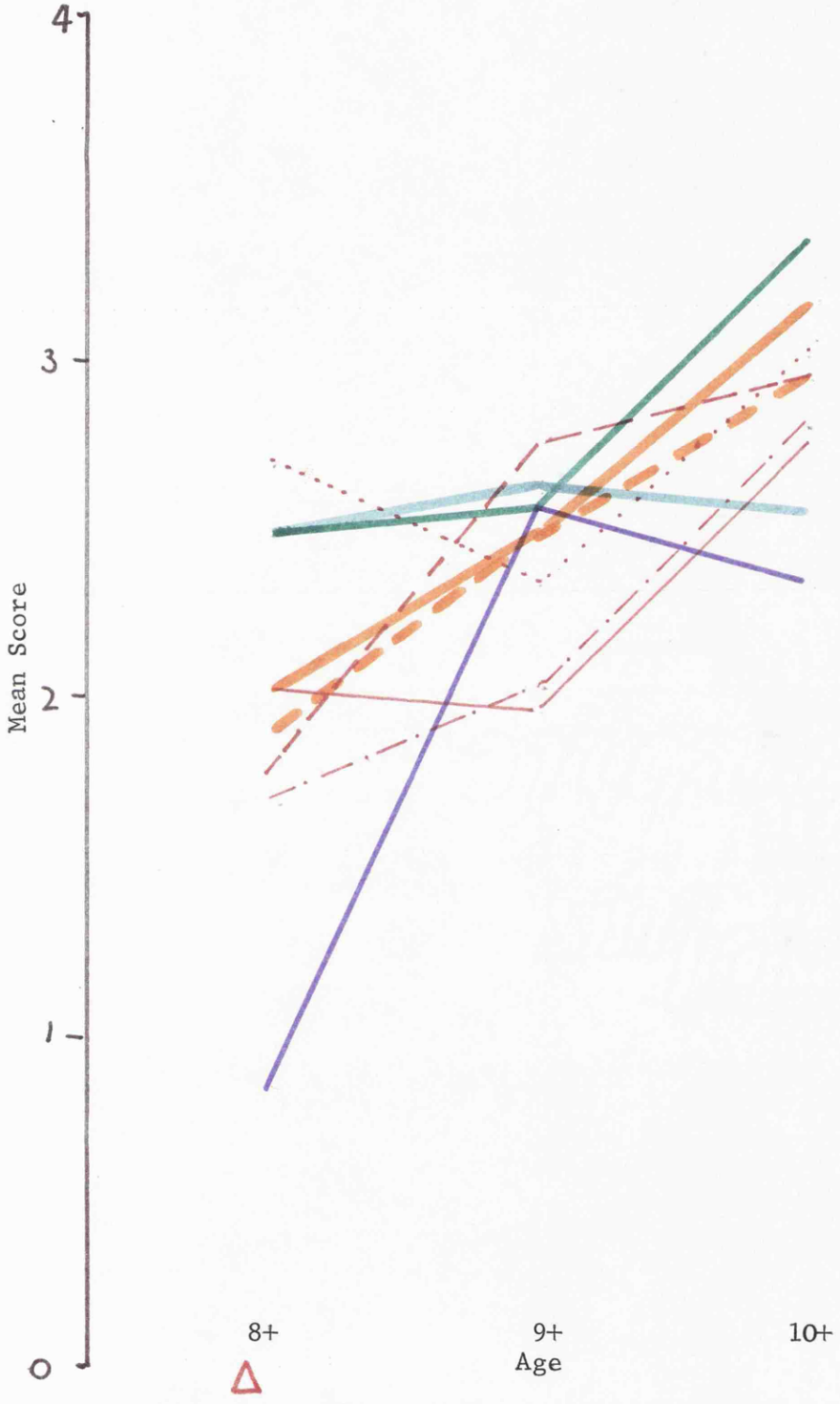
Year	8+	9+	10+
$\bar{x}$ overall	1.89	1.70	1.71
SD overall	1.48	1.34	1.32

Table 5.22. Diagram of means of classes : anxiety in class.



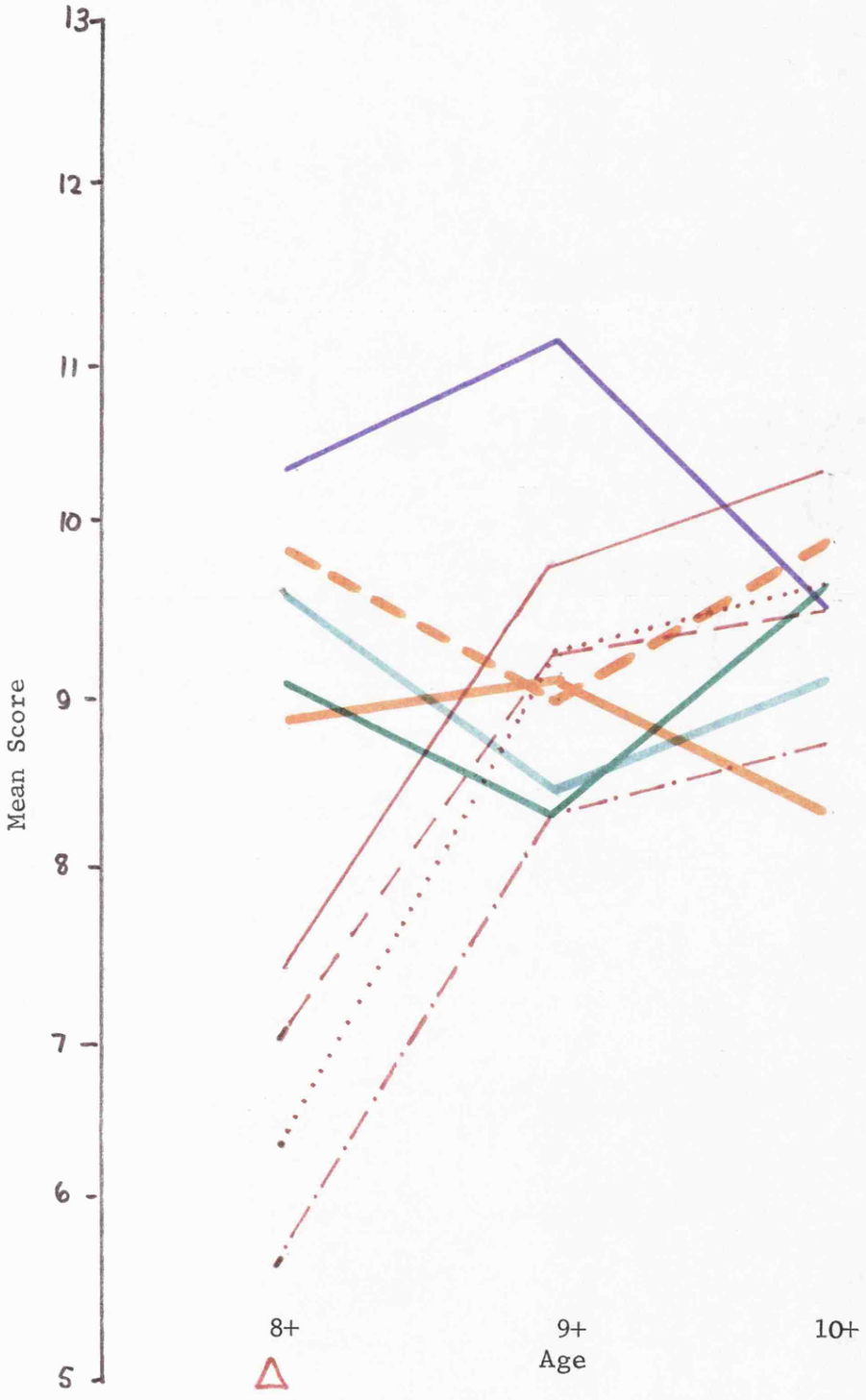
Year	8+	9+	10+
$\bar{x}$ overall	2.90	2.92	2.28
SD overall	1.42	1.49	1.45

Table 5.23. Diagram of means of classes : social adjustment.



Year	8+	9+	10+
$\bar{x}$ overall	2.29	2.42	2.85
SD overall	1.04	1.24	1.12

Table 5.24. Diagram of means of classes : self image.



Year	8+	9+	10+
$\bar{x}$ overall	8.03	9.04	9.40
SD overall	3.37	2.74	3.14

Table 5.25. summarises the F ratios between the classes at each age level, associated 't' tests were calculated following Duncan's (1953) procedure and are presented in the statistical appendix. It will be seen that differences were found in a number of areas, and these results can be used to throw further light on the differences between the sample classes. Before proceeding to a detailed discussion of the results here however it must be realised that the tables represent scores from nine classes in respect of 23 or 24 tests on each of three occasions, a total of 4,473 differences of which over 200 would be expected to show probabilities of less than .05 by chance alone. In the event some 250 differences are significant at the .05 level, 80 of them at .01 level. This latter figure is almost double that of chance expectation and does encourage a more detailed examination of the trends emerging. Nevertheless in a discussion of differences between classes the rather low proportion of significant differences suggests that a characteristic of the sample in question is the homogeneity displayed rather than the heterogeneity emphasised in the ensuing comments.

Table 5.25. 'F' ratios between classes. * = sig. 5% ** = sig. 1%

Test.	8+	9+	10+
Extraversion	1.42	1.95	1.07
Neuroticism	2.81 **	1.44	4.16 **
Spelling	0.35	0.93	0.64
Reading	0.41	1.03	1.14
Number	4.15 **	5.01 **	4.79 **
Comprehension	1.61	1.37	0.70
V. Reasoning	1.93	1.37	2.06 *
N. Problems	2.15 *	2.42 *	3.17 **
S. Reasoning	(No test)	5.86 **	2.54 *
Attitudes to Composition	3.31 **	10.61 **	2.38 *
Reading	4.44 **	0.51	2.21 *
Mathematics	4.06 **	3.05 **	2.44 *
P.E.	5.03 **	3.26 **	2.10*
Art	12.68 **	1.76	1.19
Attitude to School	1.57	4.49 **	2.51 *
Interest in School	0.53	3.83 **	2.45 *
Importance of doing well	1.33	1.67	1.41
Attitude to class	4.92 **	1.47	4.31 **
Other image	2.18 *	2.71 **	3.44 **
Conforming	1.72	4.51 **	4.95 **
Rel. with teacher	1.60	1.92	1.57
Anxiety in class	1.55	2.45 *	3.79 **
Social adjustment	2.23 *	0.93	1.12
Self image	7.76 **	1.26	1.19

5.3 Differences between schools : personality

There is only one significant difference between schools, E having lower neuroticism means at age 7+ ($p<.05$). As personality scores are used only for grouping these 4 differences amongst 108 were considered to be of insufficient importance to disturb the analysis and the sample classes appear homogeneous in personality scores.

5.4 Differences between schools : ability

School C shows superiority in verbal reasoning at all ages, and the range of spatial reasoning scores is very wide with A, B and C superior to D and E. ($p<.05$ in each case). The sample is not homogeneous in ability. It is not possible to suggest a reason for these differences other than the simple observation that they probably indicate differences in catchment of pupils between the schools.

5.5 Differences between schools : attainment

Remarkably few significant differences are observed here, the sample classes do not differ in respect of spelling, reading or verbal comprehension at any age level. In number and numerical problems significant differences emerge at each age level, A, B and C having higher means. This tendency for D and E to have lower means can be seen in those areas where differences do not reach statistical significance and is probably a function of the superiority ability of A, B and C.

5.6 Differences between classes : attitudes towards curriculum

Differences here reflect changes in the curriculum at different

age levels and no general trend emerges. C is superior to B and E in attitudes towards literary activities at younger but not older age levels, possibly this reflects emphasis placed on skill learning and usage at different stages. The trends also reflect the general decline in attitudes towards literary activities amongst able children, as noted in previous studies (Sharples.1969. Wisenthall.1965). In mathematics favourable attitudes are probably associated with greater satisfaction and understanding on the part of more able children, and with emphasis on creative approaches rather than computational skills.

Attitudes towards Art and P.E. are generally favourable, markedly so amongst pupils in classes with pupils of lower ability.

5.7 Differences between schools : attitudes towards school

At first year level there are significant differences in four areas. A_2 and C are superior in attitudes towards class, E classes having low scores, ($p<.01$). A_2 and C are also superior in 'other image' where A and B show lowest means ($p<.05$). C generally shows a favourable attitude to school and the significant results here probably reflect the small numbers in that class and the higher ability levels of the children. In each of these areas there is a trend for D to fall dramatically in attitude ($p<.01$).

In social adjustment class C has a lower mean than B, D and E at 8+ ($p<.05$), this may be caused by the small numbers in C limiting social interaction. At 8+ E has low means in self image ($p<.01$), lower ability levels and less favourable background may account for this. At subsequent ages school D becomes distinctive with low attitudes towards school, low interest in school work, a poor image of others' image of their class and low anxiety about school. Results

which indicate a class in which low attainments are perhaps more acceptable, and the general climate is non-threatening but at the same time not one seen as attractive by the children. In contrast C tends to greater interest in school and attitudes towards it, an improved image of other's opinions and greater anxiety about school work, characteristics shared less markedly by school B; these results suggest regimes in which tensions are created in relation to learning and a congenial climate is developed. E and A appear not to be distinctive.

5.8 Test characteristics of the sample schools : summary

School A has generally average attainment levels, with children showing a slight superiority in spatial reasoning at 10+ and a higher mean in number at all ages. There are favourable attitudes towards school but the opinions of others are seen by the children to be rather low.

School B is high in attainment and in attitudes to mathematics and attitudes to literary activities improve at each age level. The children view school favourably and have a good 'others' image' of their class. The pattern is generally similar to that shown by School A.

School C is distinctive in many ways, although results here must take account of the small numbers involved. The children are high in attainment and ability, especially in literary skills, and in attitudes towards mathematics. Literary activities are less favourably viewed, but interest in and attitudes towards school are high. The children have a favourable 'others' image' and show some

anxiety about school work. The picture presented is one of an achievement oriented school which at once preserves tension in school work and favourable attitudes towards it. The school is small with only one Junior class and the results here may indicate the extent to which the teacher has created a climate within which the children continue to attend to school activities when left unsupervised, as is inevitable in such an organisation. These characteristics were not found in other schools, although in all classes the teacher's attitudes towards the children seemed sympathetic and supportive.

School D also showed interesting trends, many of which run counter to those noted in C. Here lower attainments in number are coupled with generally declining attitudes in many areas, towards school, interest in school work, others' images, and in concern over school work. The picture is one of a school of lower achievement but in which attitudes towards activities remain moderate and little anxiety is created.

School E has four classes which show some similarity, of the 426 differences between the classes only six are significant at .05. Viewed in this light differences are hardly of note, in attitudes to conformity E_3 is superior to E_4 at 9+ and 10+, and E_1 to both E_2 and E_4 at age 10+, ($p < .05$). It will be noted from the tables that E_2 and E_4 are commonly lower in mean score, and in differences involving other classes these two are frequently significantly lower. Other differences amongst E means show a superiority of E_3 to E_4 in attitude towards composition at 9+, and of all other E classes to E_4 in attitudes towards mathematics at 10+.

The general picture here is of low abilities and attainment coupled with less favourable attitudes towards activities involving

number and language skill at lower age levels. These attitudes improve in relation to other classes, and at younger age levels they are compensated by favourable attitudes towards more expressive activities such as Art and P.E. Over the three years the children in this school show an improving attitude towards school, a better self image and increasing concern over school work; two classes show a rise in conformity over the period of the survey. These results characterise a school of low ability where the pupils become increasingly concerned about school work and find school congenial. Attitudes are not unfavourable and rise in many areas, suggesting that initial problems of low ability are dealt with in a way which involves the development of positive attitudes and the encouragement of expressive activities where formal skills are weak.

5.9 Abilities, attainments and attitudes over the whole sample : overview

Brief sketches such as these cannot of course be anything but crude images, they do nevertheless indicate broad aspects of comparison; C an achieving school with good attitudes, A and B less highly achieving 'average' schools, D a school of low attainment and declining attitudes, E of low attainment and improving attitudes. These characteristics will be returned to in a discussion of the results, but before turning to these it is instructive to consider the total pattern of scores. Table 5.26 shows the total sample attainment means on a scale which sets them against the norm data of the tests. In all areas the sample shows lower means, although not significantly so, this being most marked in number. Table 5.27 shows the sample 'attitudes to activities' mean scores on a scale which sets them against the semantic equivalents of the scores. In all areas

Table 5.26. Trends of sample means : attainment and ability.

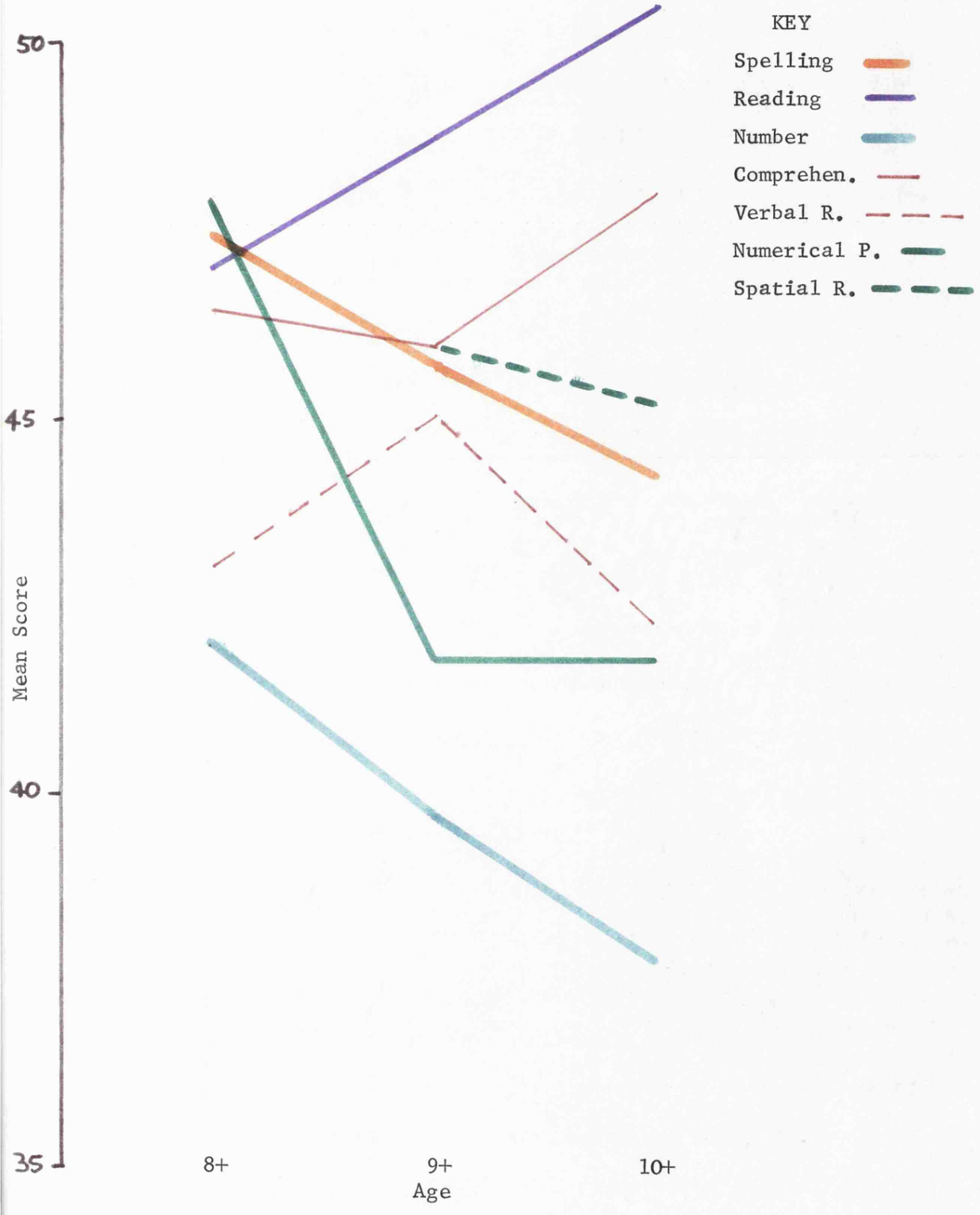
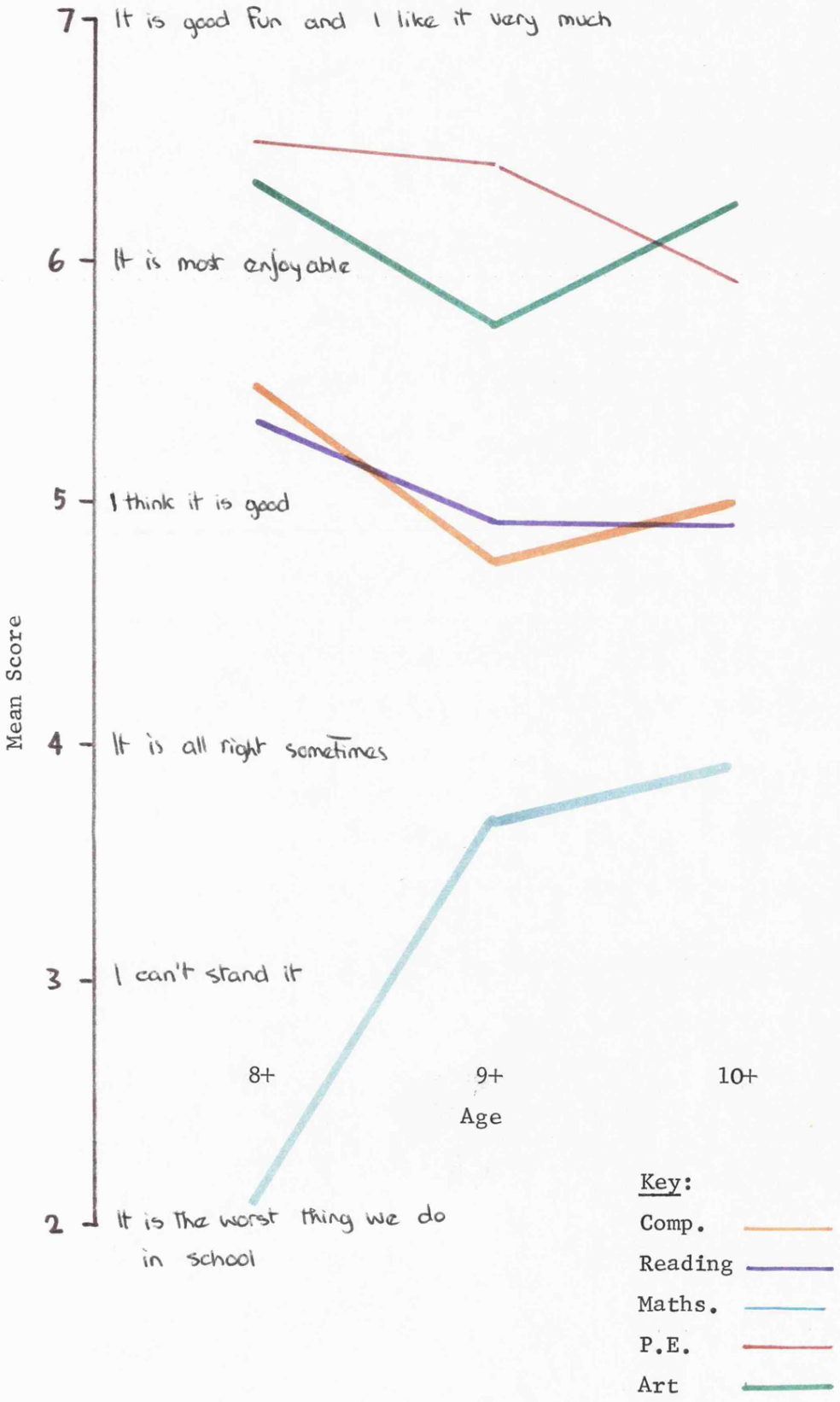


Table 5.27. Trends of sample means : attitudes to activities



attitudes are favourable, although barely so in mathematics. The expected superiority of attitudes to expressive activities and the central position of literary activities is also demonstrated. Notable here is the trend for the means to rise slightly at 10+, running counter to previous evidence of children's attitudes. The trend is not significant but does suggest that the schools here have been successful in promoting good attitudes. Means of attitudes to school are not summarised here, they show a very marked stability over the three years of the study and were generally reported in Chapter Four.

Chapter 6.
Statement of results.

The results of the survey described in Chapter 4 are here presented in summary form, considering data of personality, attainment, attitudes and the interactions of these. In the present chapter the data are presented in diagrammatic form, accompanying tables in the statistical appendix present the data in numerical form and the location of these tables is indicated throughout this chapter. The statistical analyses applied to the data are indicated here, and the results of tests of significance are also indicated. In the text, summary tables show 'F' and 't' ratios for main effects only, in the statistical appendix full summaries of the calculations are presented. The techniques of analyses employed at each stage were described in chapter 4 and reference here is made to procedures discussed there. Each section of the results is prefaced by a brief comment summarising the general pattern of the data and indicating the range and location of the diagrams and tables. Discussion of these results in relation to the hypotheses presented in chapter 3, is reserved to chapter 7.

6.1 Personality

Personality scores were obtained during each year of the study for each child. Mean scores in Extraversion rose with age, neuroticism scores levelled at 9+. Trends for both sexes were similar; boys were consistently higher in extraversion, significantly so at 8+ ($p<.05$), girls were higher in neuroticism at 8+ and 9+.

The overall trends of personality scores are given in Table 6.1 - 6.2 for sexes separately.

Table 6.1 Diagram of sample mean extraversion scores : sexes separately

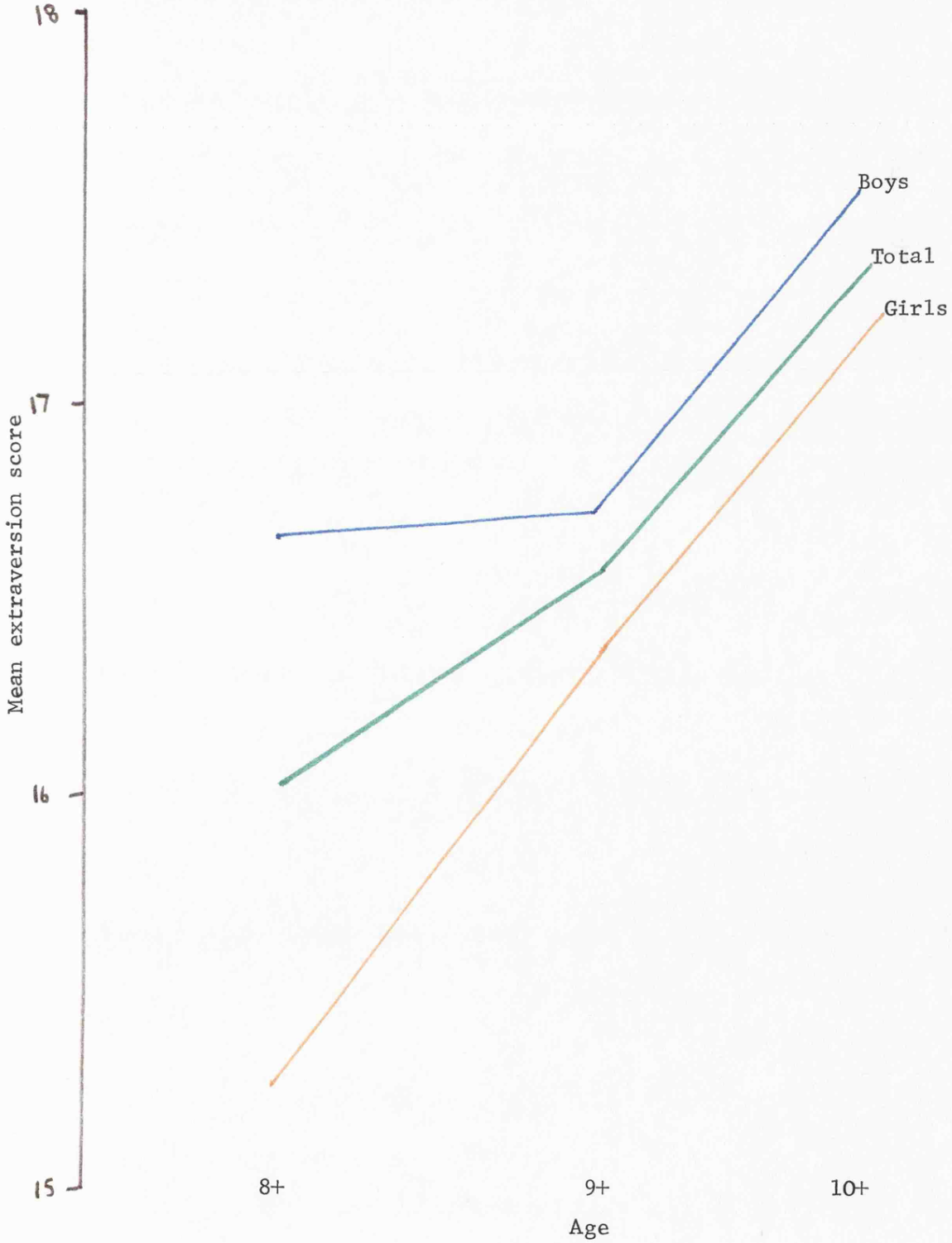
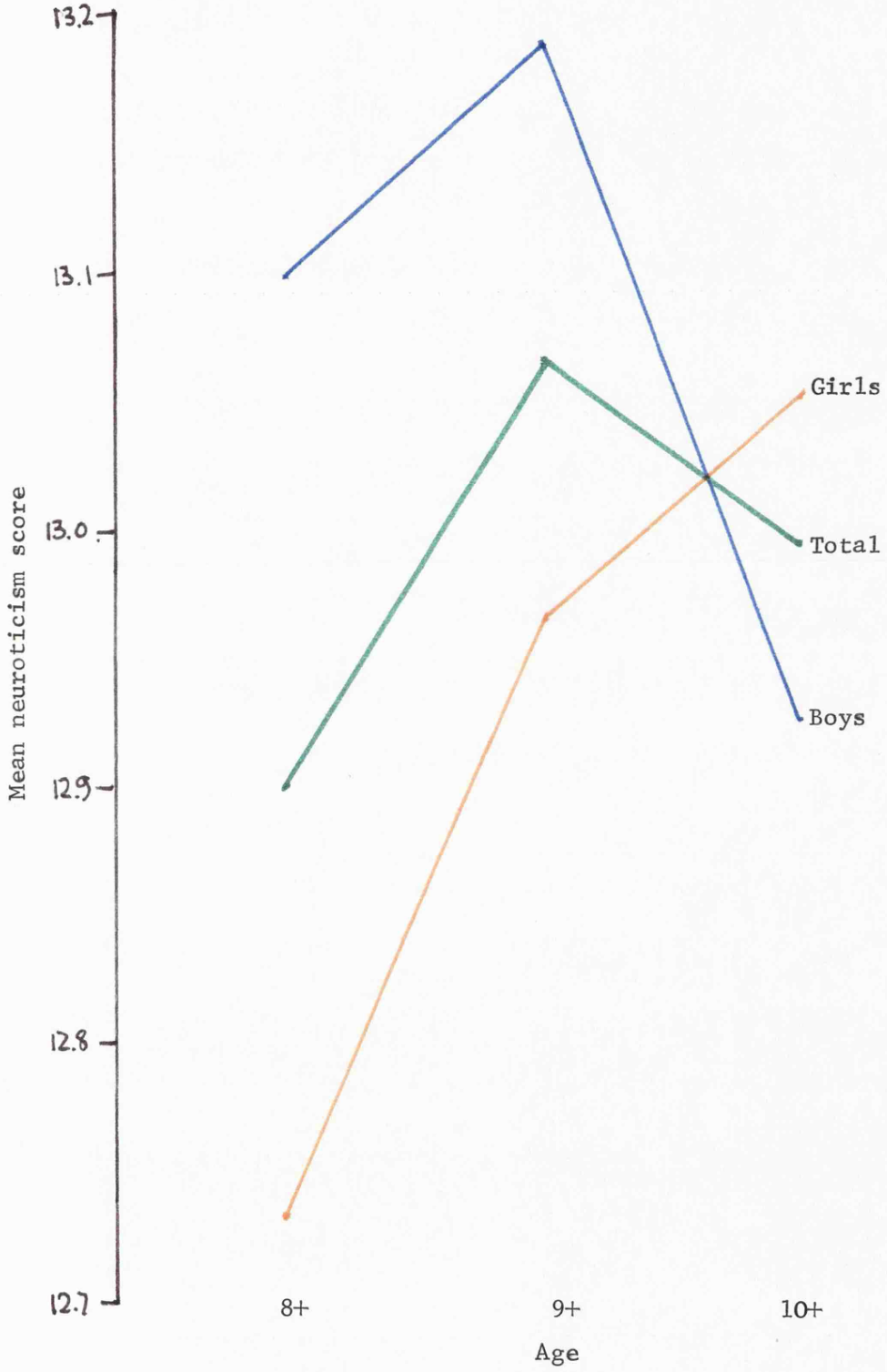


Table 6.2 Diagram of sample mean neuroticism scores : sexes separately



The stability of the personality measures was assessed by correlations between successive testing at one year intervals. The coefficients have been reported in chapter 4. At each age level groups of 'high', 'moderate' and 'low' score on each personality dimension were determined; tables 6.3 and 6.4 illustrate the stability of group means by plotting the means obtained at 9+ and 10+ from groups classified at 8+ as 'high', 'moderate' or 'low'. The tendency for the groups to converge can be clearly seen. In the study groups were re-defined at each year level, as described in chapter 4.

The trend of scores of the 8+ personality groups were further examined in relation to attainment levels. A group of 'high attainers' was determined by selecting subjects who at 8+ had scores above the mean in five of the six attainment tests. The subsequent personality means of this group were compared with those of subjects failing to gain any scores at or above the mean at 8+. Both groups showed similar trends in extraversion, scores falling slightly at 9+, but with no significant differences between attainment groups or years. High attaining stable children at 8+ showed significant subsequent increases in neuroticism from 9+ to 10+ ($p < .01$), whereas stable low attainers at 8+ levelled off in neuroticism after 9+. Between these latter groups there were significant differences in neuroticism at 8+ and 9+.

Tables 6.5 and 6.6 present diagrams of the results, and Table 6.7 summarises the 't' tests described above. The statistical appendix presents full summaries of the F tests involved. (Table 65)

Table 6.3 Diagram of means of subsequent extraversion mean scores of groups classified as extravert at 8+.

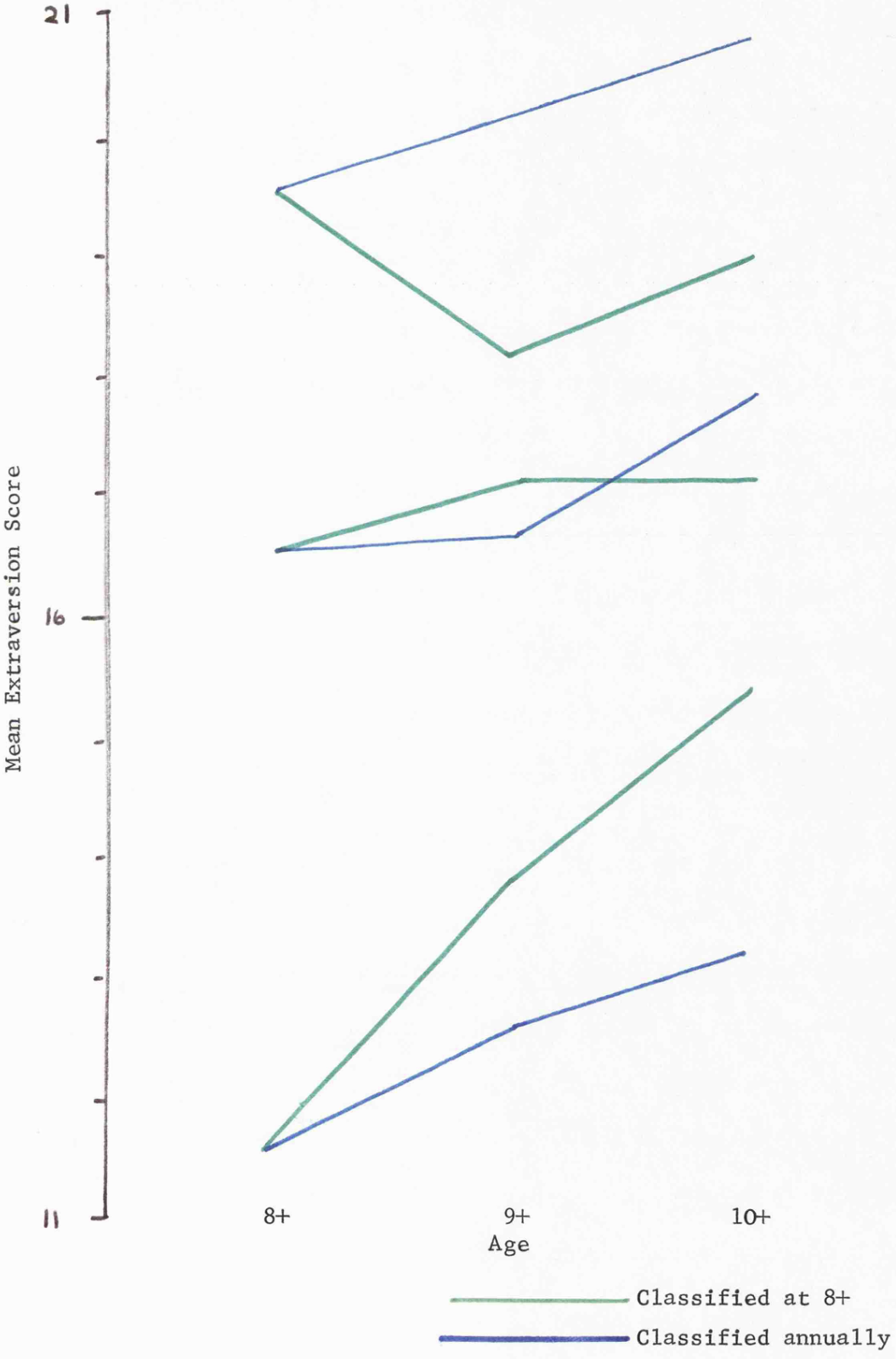


Table 6.4 Diagram of means of subsequent neuroticism mean scores of groups classified as neurotic at 8+.

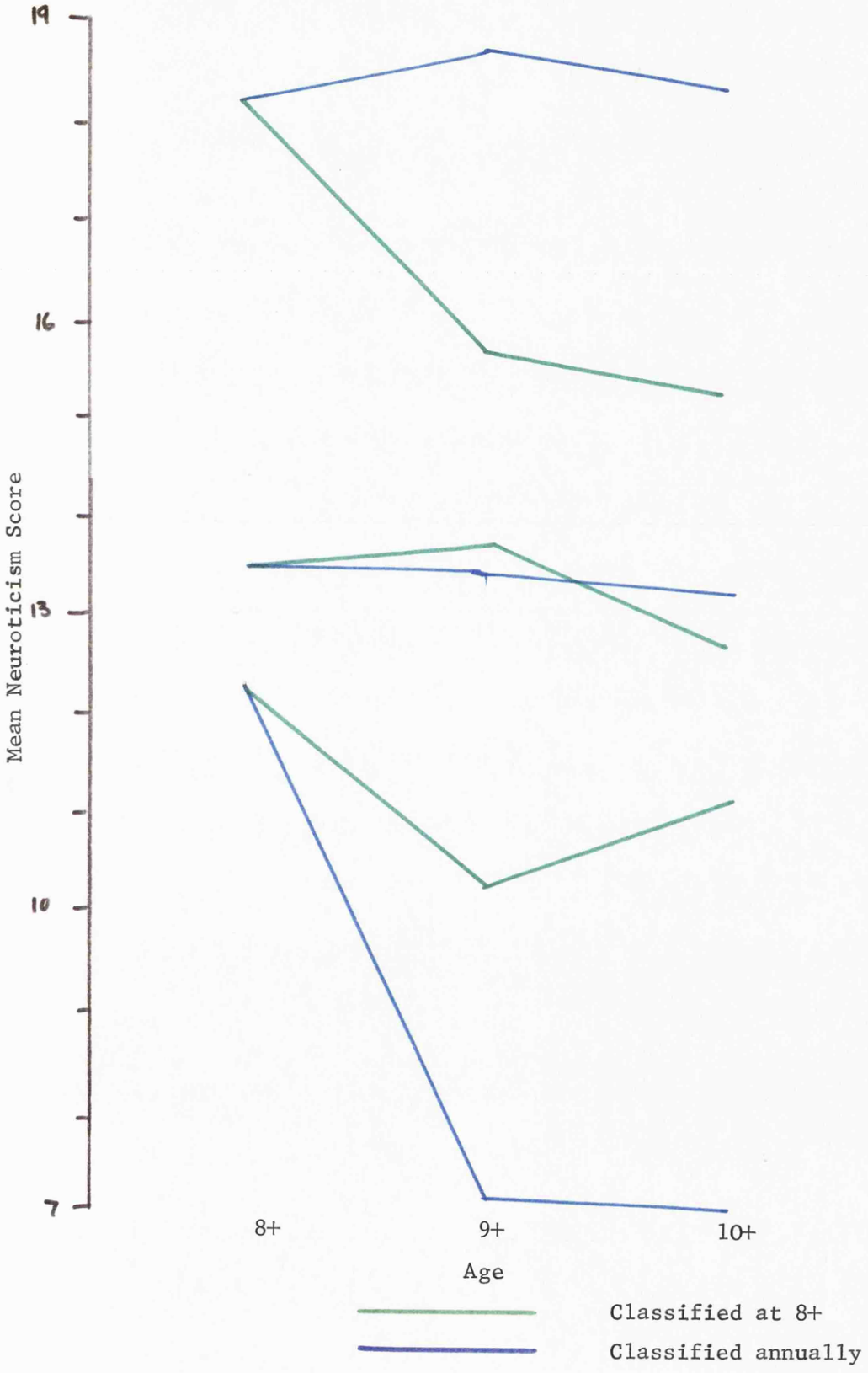


Table 6.5 Diagram of trends of means of extraverts of High and Low attainment.

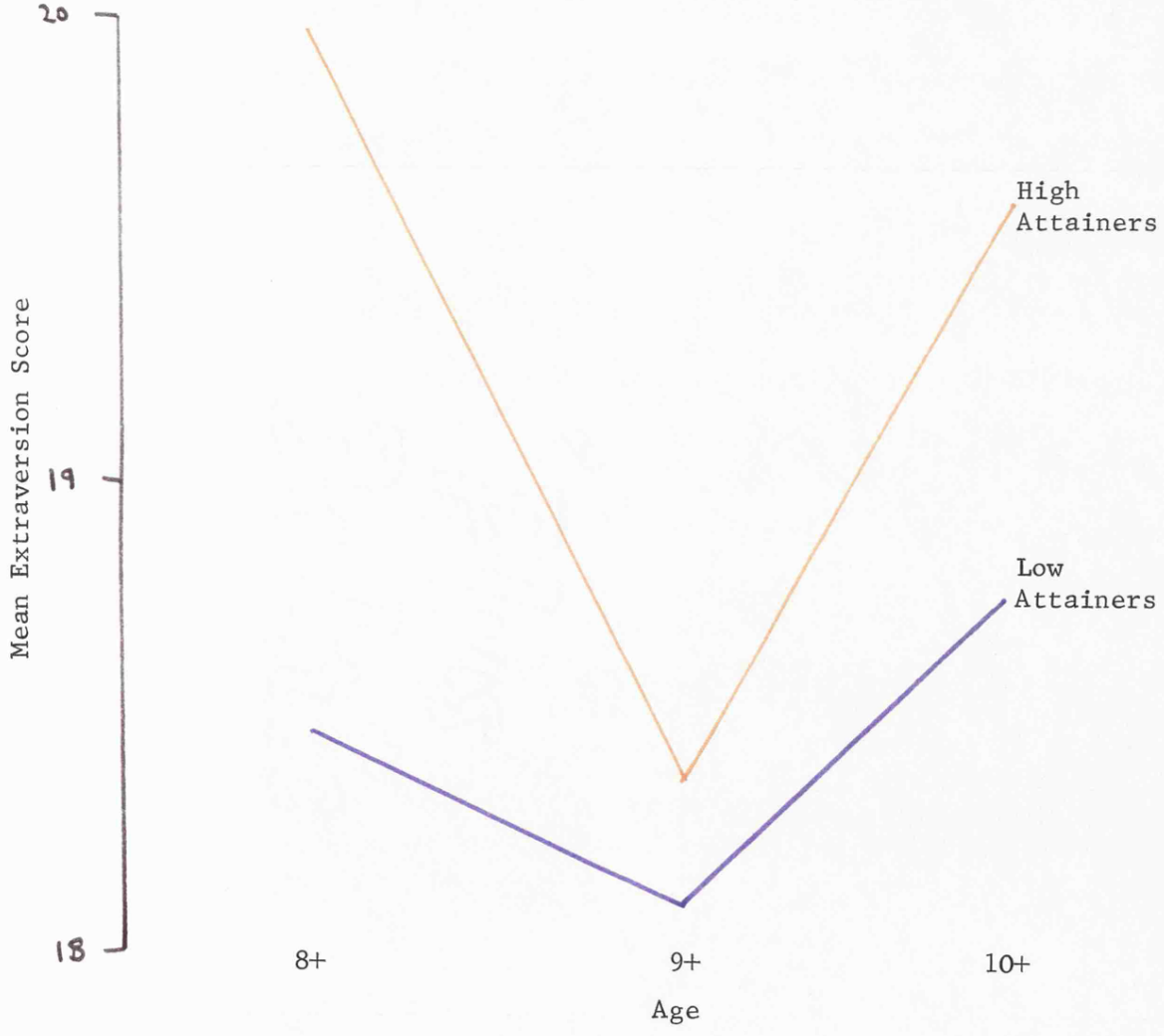


Table 6.6 Diagram of trends of means of stable children of High and Low attainment.

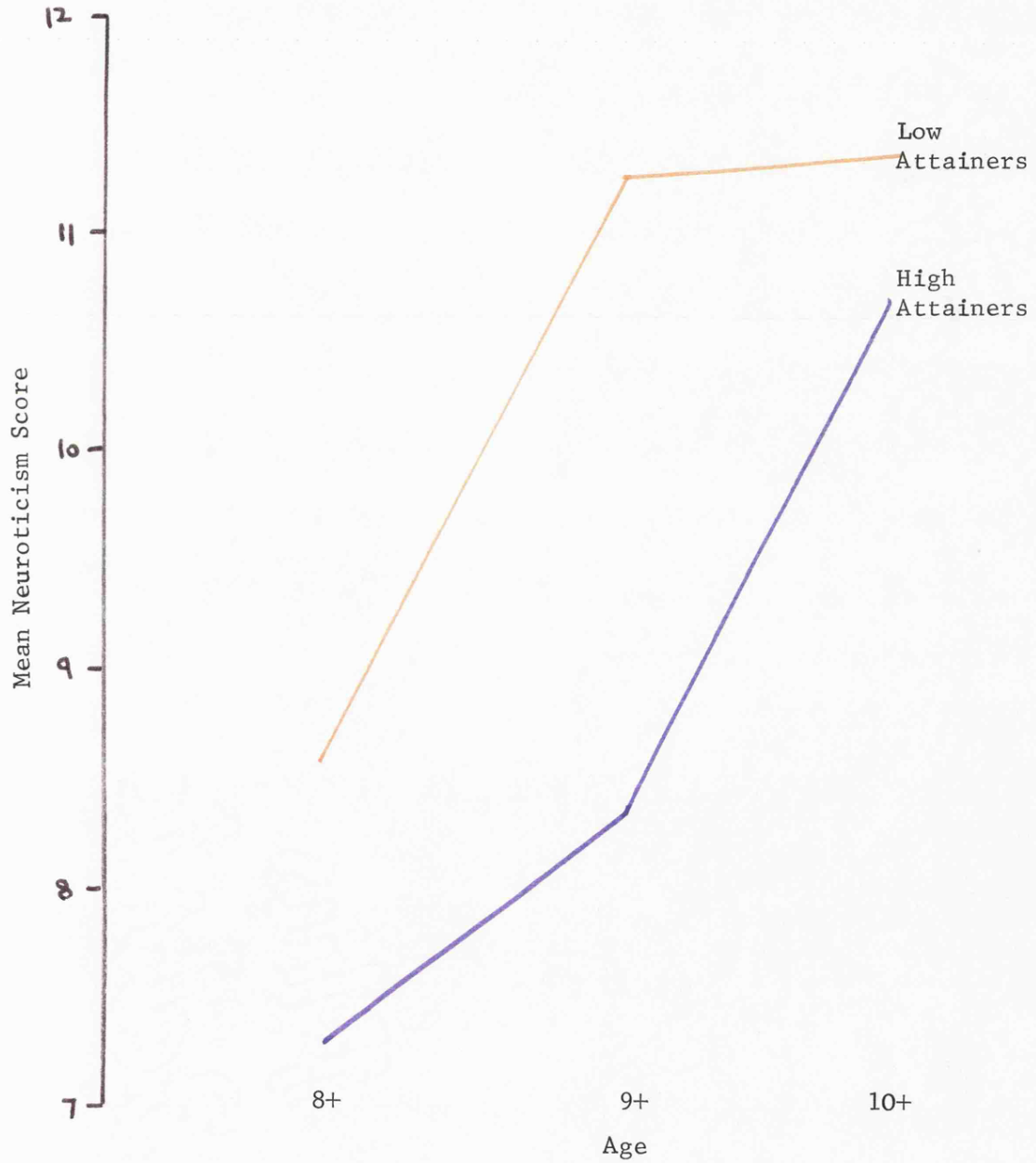


Table 6.7

't' ratios amongst personality scores of extravert and stable groups, defined at 8+.

Group	't' for difference between age groups		
	8+ and 9+	8+ and 10+	9+ and 10+
High attaining extraverts	2.36**	0.61	1.73
Low attaining extraverts	0.60	1.63	.96
High attaining stable	0.98	2.91**	1.73
Low attaining stable	3.70**	0.11	3.85**
Comparison	8+	9+	10+
High v Low extraverts	1.14	0.39	1.53
High v Low stable	2.07*	2.64*	0.49

** = sig. 5% * = sig. 1%

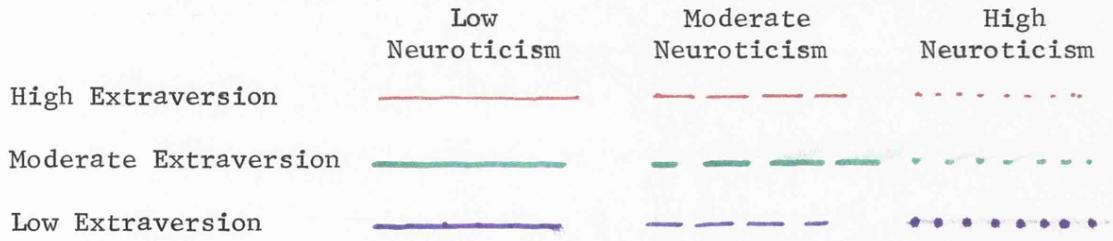
6.2 Attainments

6.21 Attainments : overall results

Attainment tests were repeated each year of the study for each child. Mean scores in each attainment area were calculated for each cell of the 3 x 3 matrix defined by personality levels of extraversion and neuroticism (see chapter 4.).

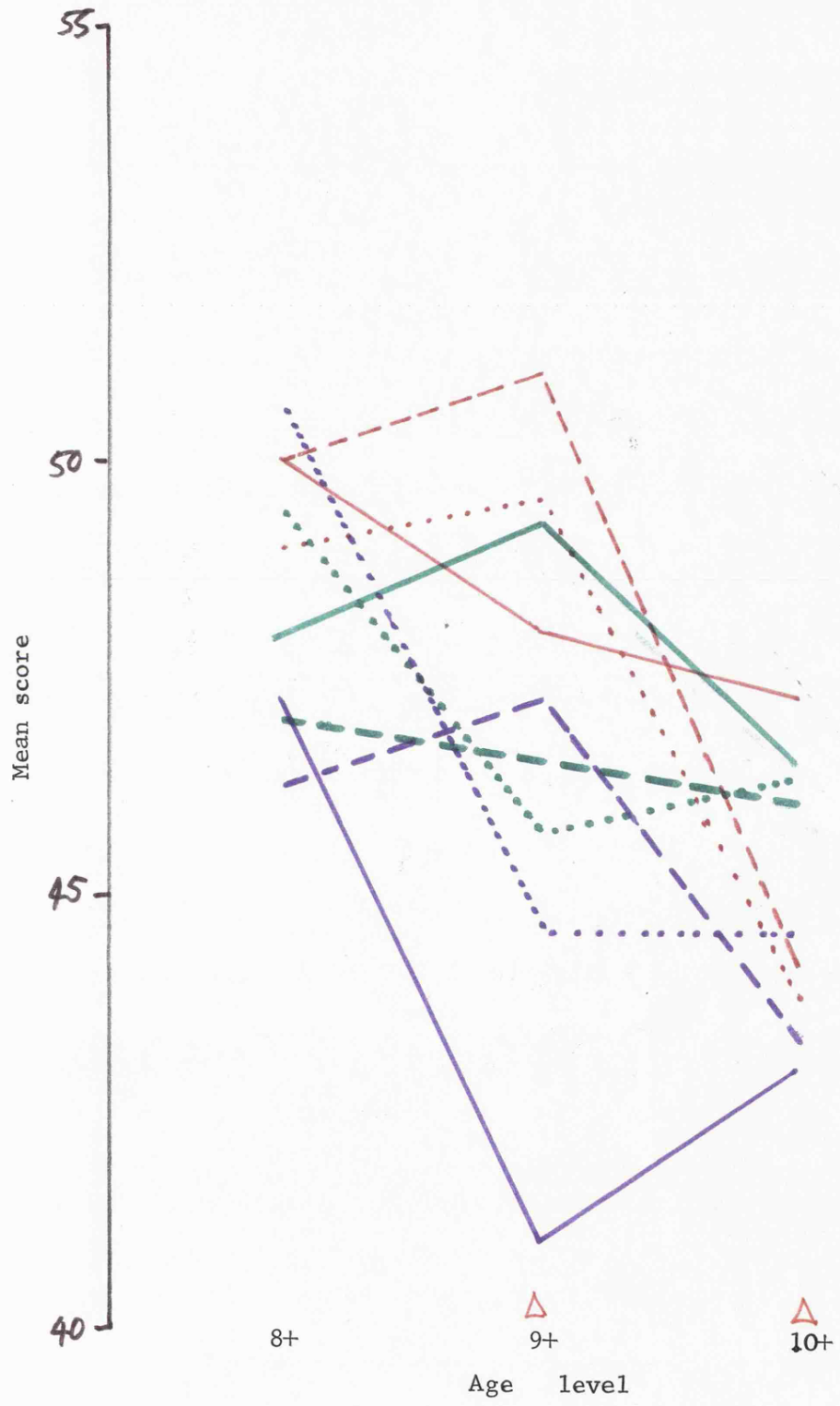
Tables 6.8 to 6.14 present diagrams of the results, only in number, at 9+, were differences between boys and girls significant and in the diagrams both sexes are shown together for clarity. The statistical appendix gives data overall and for boys and girls separately.(66-113)

Throughout the diagrams in this chapter the following code is employed:



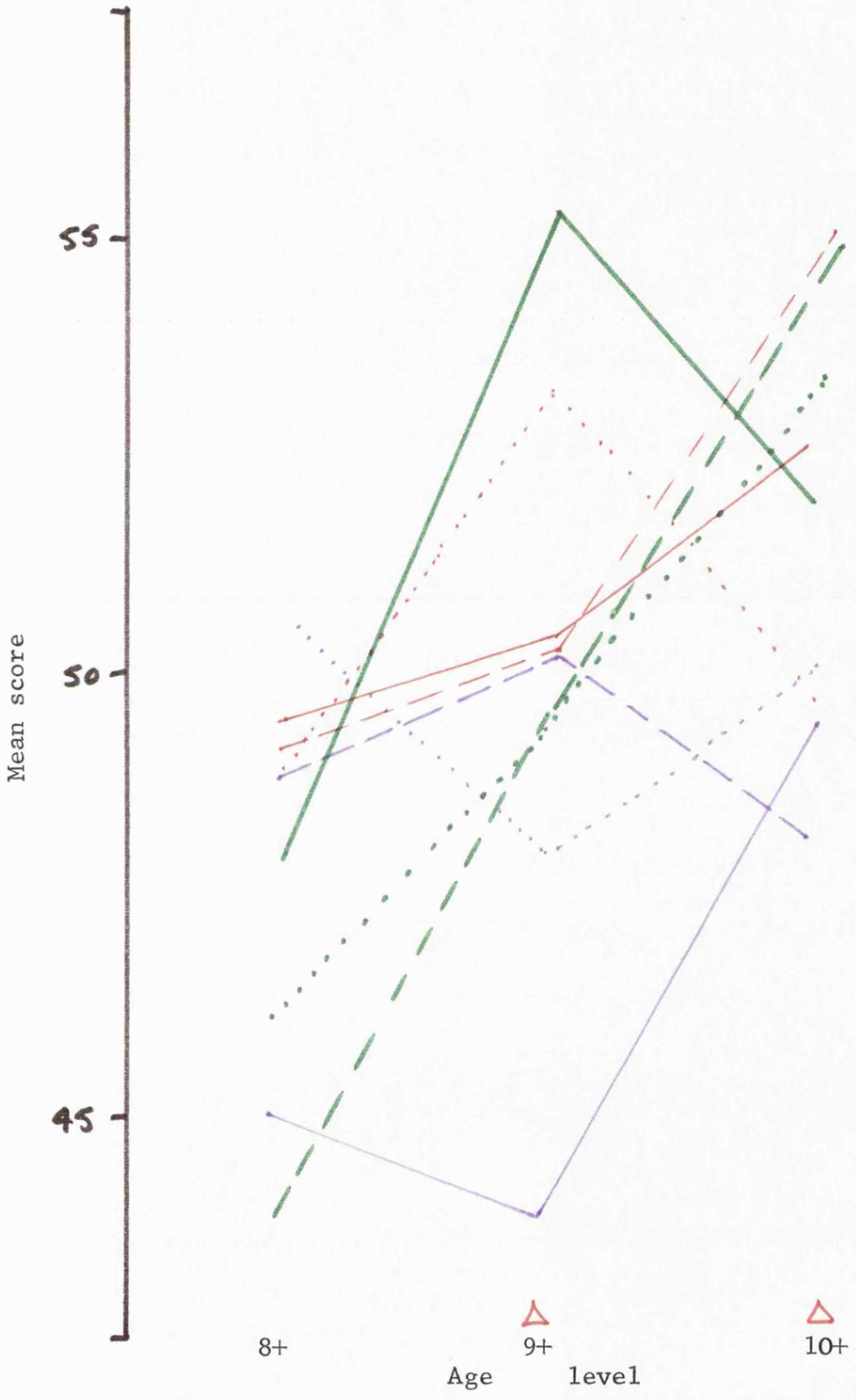
Where significant 'F' ratios were identified amongst means at a given age level the appropriate column is marked △.

Table 6.8 Diagram of mean scores of personality groups : spelling



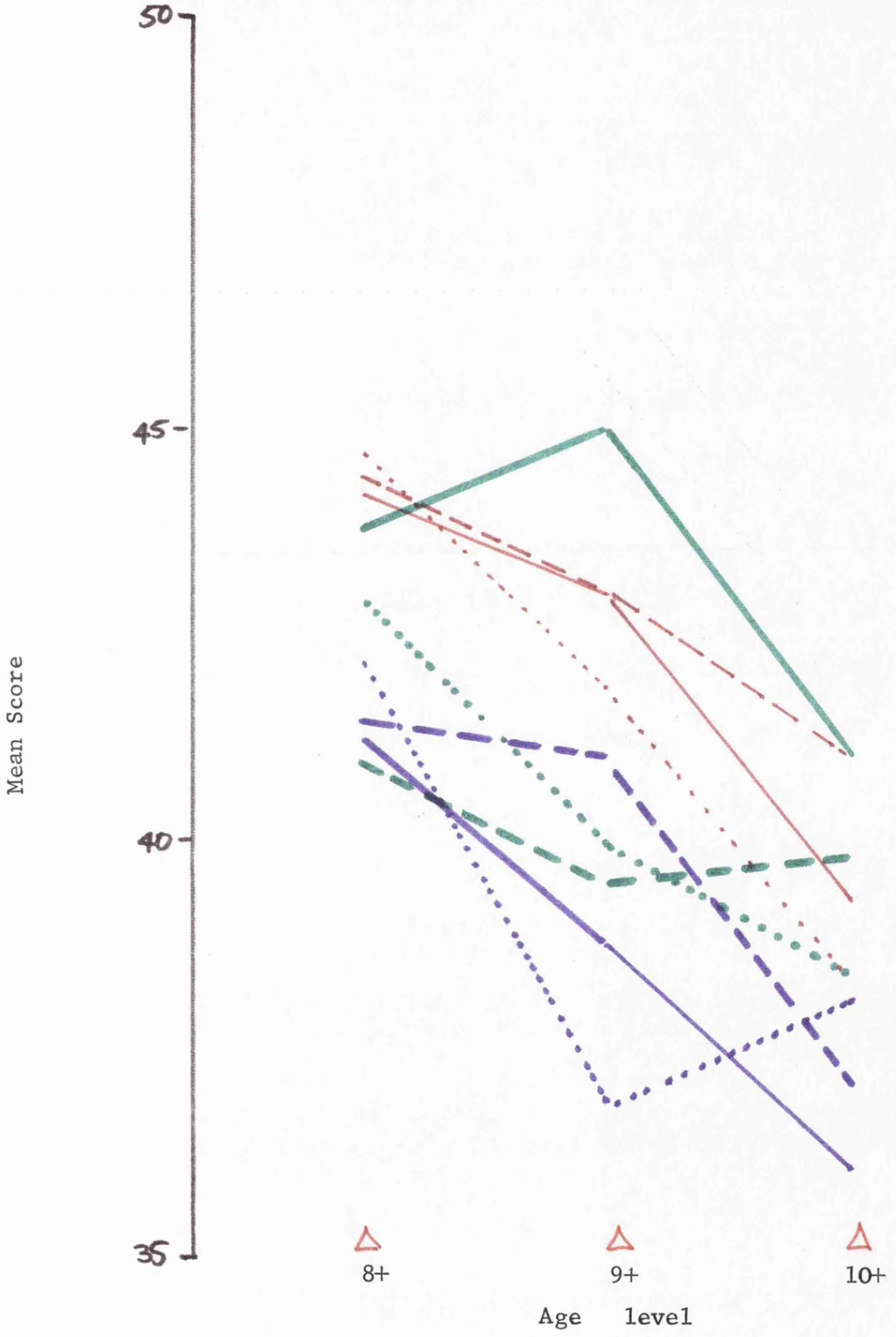
See statistical appendix tables. 66-71

Table 6.9 Diagram of mean scores of personality groups : reading.



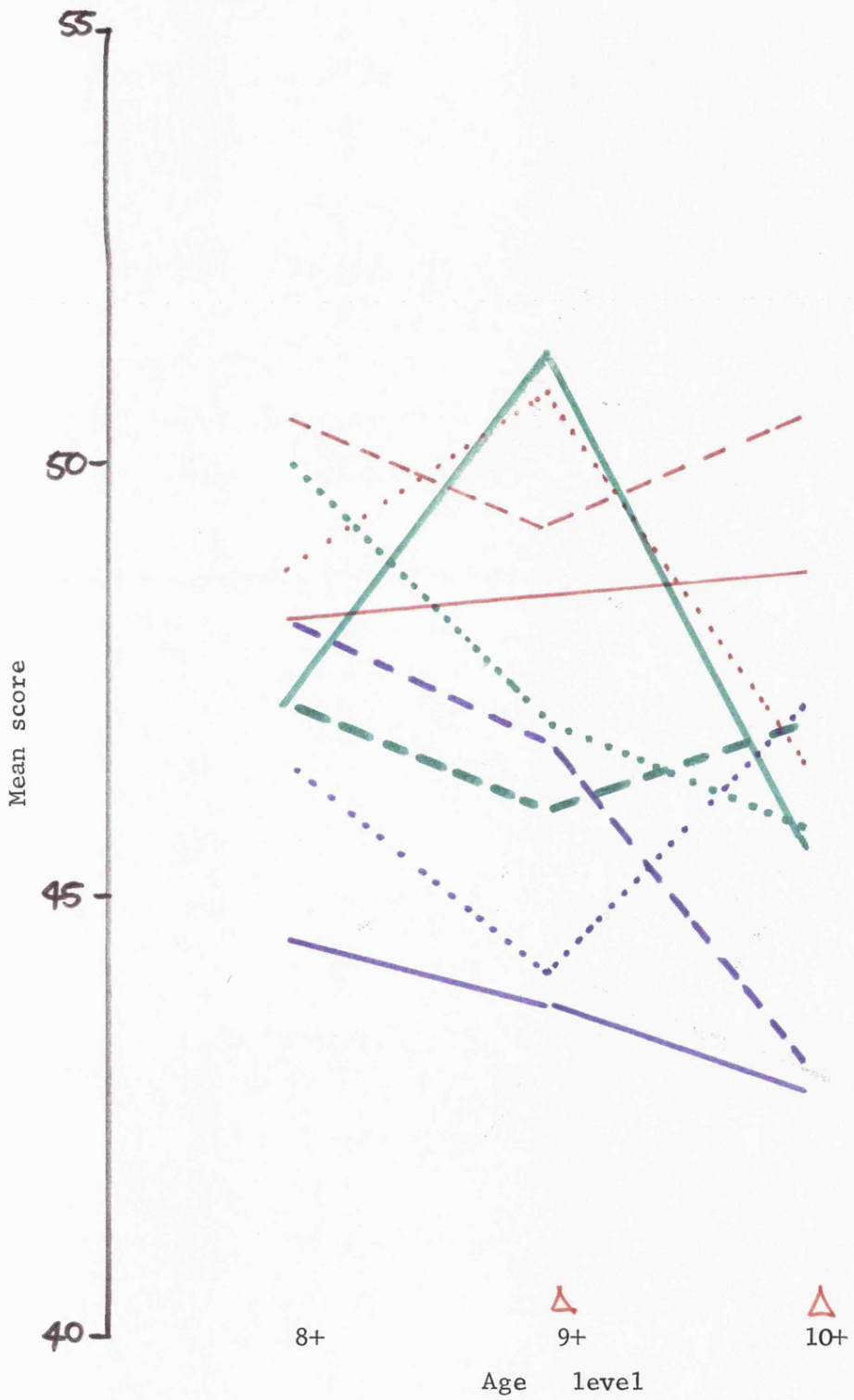
See statistical appendix tables. 72-78

Table 6.10 Diagram of mean scores of personality groups : number.



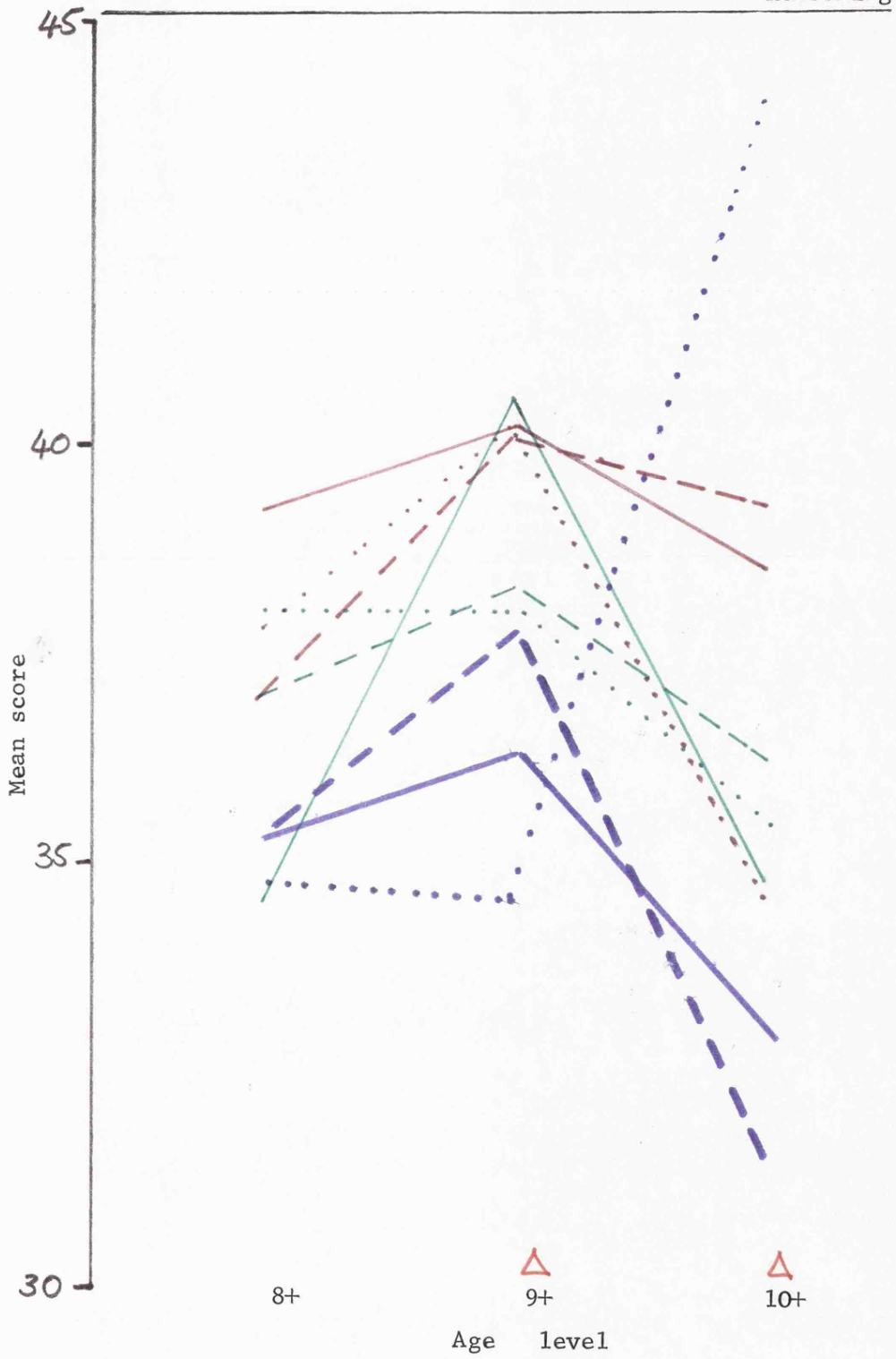
See statistical appendix tables. 79-86

Table 6.11 Diagram of mean scores of personality groups : Comp/Vocab.



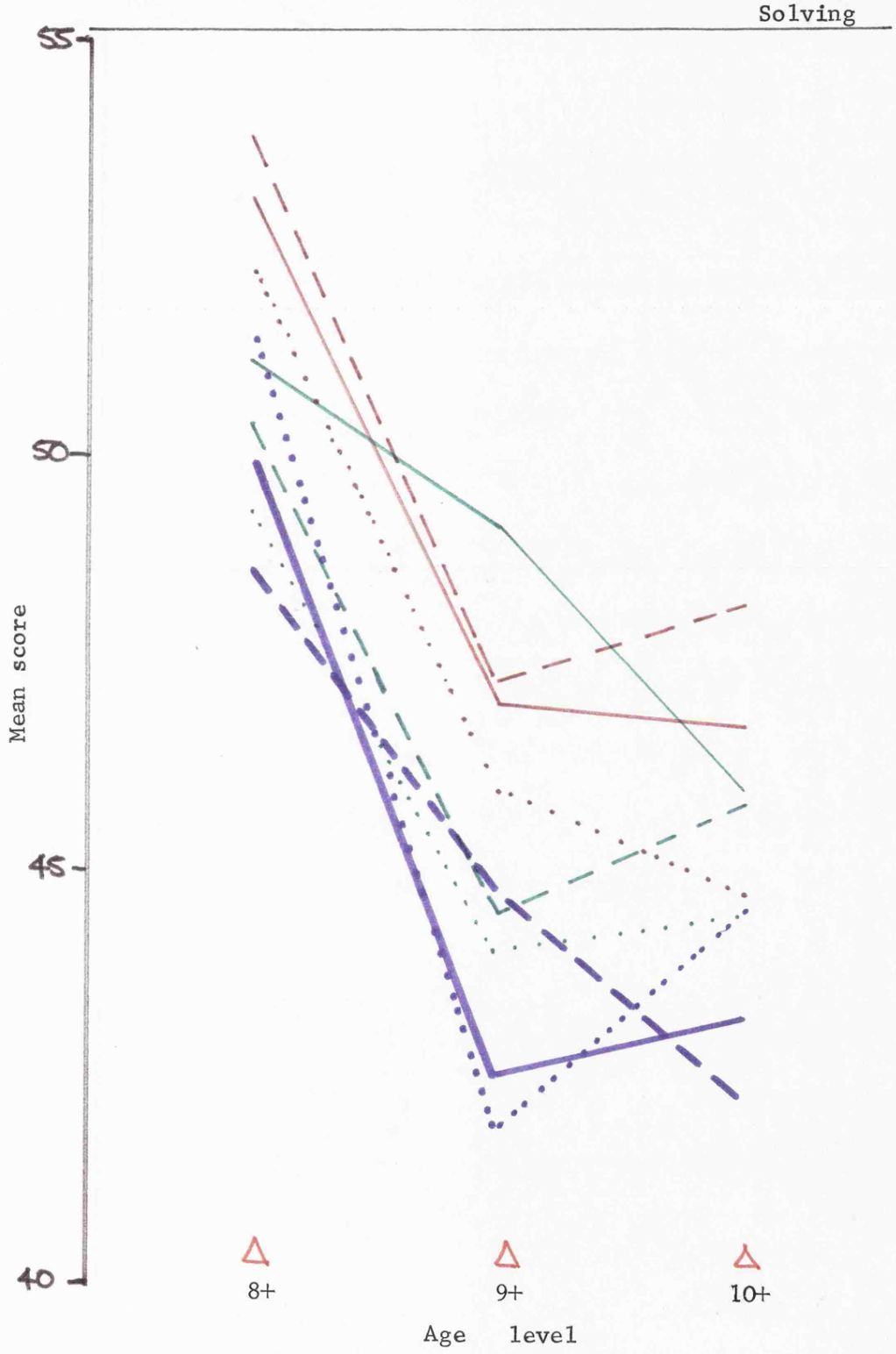
See statistical appendix tables. 87-93

Table 6.12 Diagram of mean scores of personality groups : Verbal Reasoning



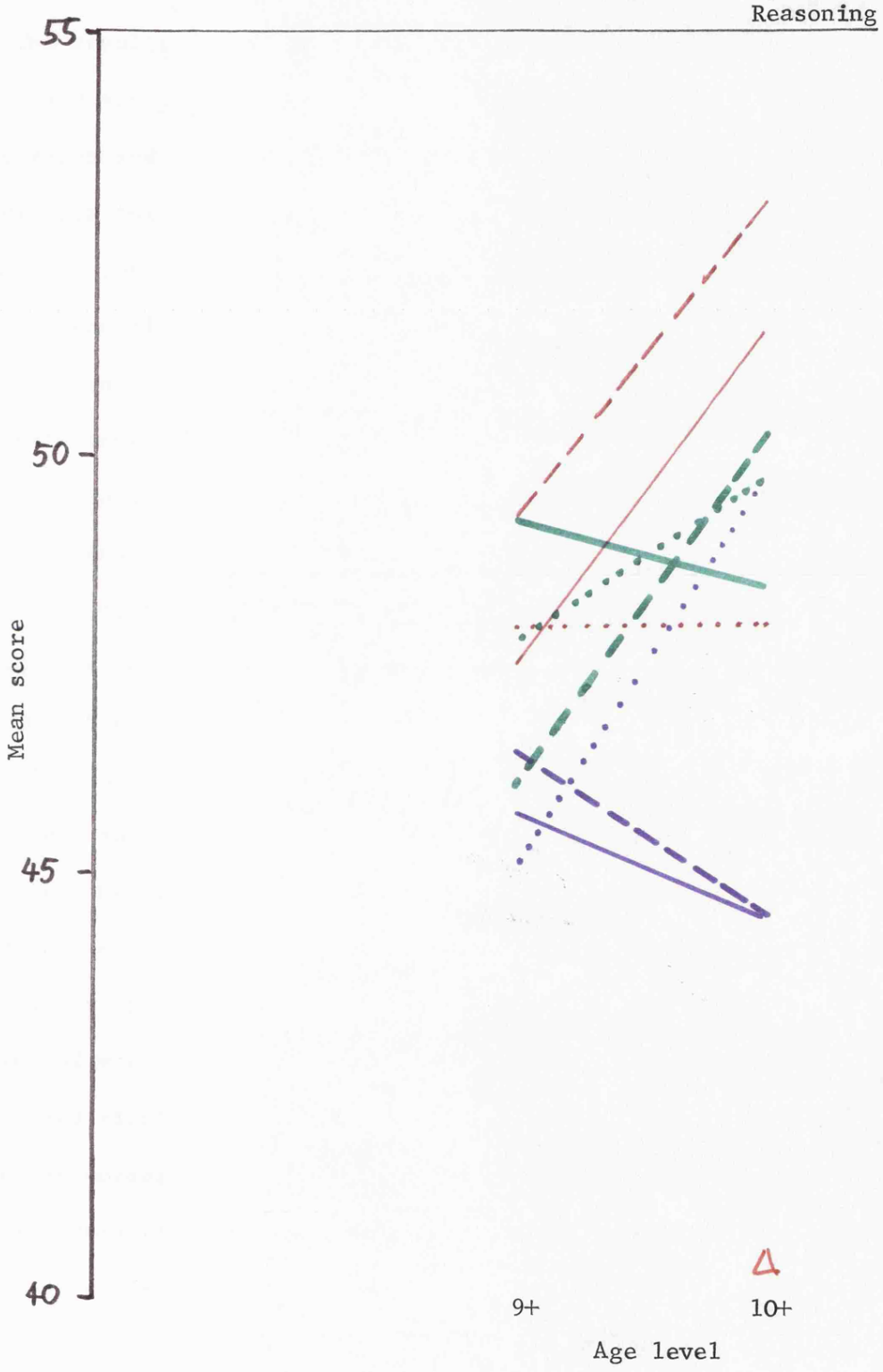
See statistical appendix tables. 94-99

Table 6.13 Diagram of mean scores of personality groups : Num.Problem Solving



See statistical appendix tables. 100 - 107

Table 6.14 Diagram of mean scores of personality groups : Spatial Reasoning



See statistical appendix tables. 108-113

6.22 Attainments : analyses of variance.

The results summarised in the foregoing section were subject to a 2 x 3 x 3 analysis of variance, in respect of sex, three levels of extraversion and three levels of neuroticism. At each year level the criteria for division into personality groups were derived from personality test data obtained closely in time to the attainment scores.

In general the analyses show consistent significant interactions between extraversion and attainment, but no other general trend. Extraverts appear to be superior to introverts at 9+ and 10+, in Number and Spelling this superiority tends to diminish a little at 10+, in other areas it is maintained.

Table 6.15 summarises the 'F' ratios of the analyses of variance, indicating also the patterns of significant differences.

In tables the code letters H.E., M.E., L.E., H.N., M.N., and L.N. are used to designate personality groups by initial letters. Tables in the text summarise 'F' ratios only for main effects of sex, extraversion and neuroticism. Interaction effects are shown in the statistical appendix and are subsequently discussed in the next chapter.

Tables in the statistical appendix present summaries of the analyses of variance, and the multiple range 't' tests employed where 'F' reached significance. 't' tests were carried out only for main and second -order effects, no hypotheses having been generated for the complex interaction of sex, extraversion and neuroticism.

See statistical appendix. 66 – 113

Table 6.15 Summary of 'F' and t ratios of attainment scores for main effects : sex, extraversion and neuroticism.
(** or⟫= 1% * or> = 5%)

		Spelling	Reading	Number	Comp/ Vocab	V.R.	N.Prob.	S.R.
Sex	8+	F	1.49	1.17	2.83	0.11	0.16	0.81	-
		't'	-	-	-	-	-	-	-
	9+	F	0.07	1.18	1.32	0.07	0.31	6.69**	2.70
		't'	-	-	-	-	-	-	-
	10+	F	2.69	0.53	2.19	0.17	0.06	0.98	1.50
		't'	-	-	-	-	-	-	-
Extraversion	8+	F	1.50	1.18	4.35**	2.77	2.36	3.52*	-
		't'	-	-	HE⟫ME⟫LE	-	-	HE⟫ME LE	-
	9+	F	8.76**	6.81**	6.10**	9.77**	4.77**	7.10**	2.62
		't'	HE⟫ME⟫LE	HE ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE	-
	10+	F	3.37**	5.21**	3.85*	5.62**	6.87**	5.06**	7.01**
		't'	HE ME⟫LE	HE⟩ME⟫LE	HE ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE	HE⟫ME⟫LE
Neuroticism	8+	F	1.00	0.44	0.50	1.45	0.07	0.05	-
		't'	-	-	-	-	-	-	-
	9+	F	0.67	0.00	3.50**	0.46	1.10	3.04*	0.33
		't'	-	-	LN MN⟫HN	-	-	LN MN⟫HN	-
	10+	F	0.36	1.15	0.70	1.04	0.29	0.75	0.54
		't'	-	-	-	-	-	-	-

6.23 Attainments : analyses of covariance with attainment.

Attainment scores were examined for covariance with initial attainment levels, amongst sex and personality groups at successive age levels. In each case the personality criteria were derived from the test taken between the attainment test periods (see chapter 4.).

Covariances were uniformly homogeneous, few significant F ratios emerged but where they are in evidence show an interesting trend. Whereas at 9+ no differences are significant at 10+ in number, comprehension, verbal reasoning and numerical problems extravert groups are superior. This suggests that at this stage the extravert groups gain in attainment in these areas in relation to introverts. Sex differences also show an intriguing trend where, at 10+, boys are superior in comprehension and vocabulary.

Table 6.16 summarises the F ratios of the analyses of covariance for main effects, indicating also the patterns of significant differences. Tables in the statistical appendix present full summaries of the caluclations of homogeneity and analysis of covariance, and show the multiple range 't' tests employed where 'F' reached significance.

See statistical appendix. 195 - 212

Table 6.16 Summary of F and 't' ratios of attainment scores adjusted for covariance with attainment, for main effects : sex, extraversion and neuroticism.

			Spelling	Reading	Number	C/Vocab	Verbal R.	N.Prob.
Sex	9+	F	0.83	0.00	0.89	1.81	0.37	3.81
		't'	-	-	-	-	-	-
	10+	F	1.86	1.51	8.11**	4.10*	0.84	0.33
		't'	-	-	G≫B	B>G	-	-
Extra-version	9+	F	0.37	1.40	2.99	2.91	1.86	1.64
		't'	-	-	-	-	-	-
	10+	F	0.89	2.52	3.99*	3.27*	6.66**	3.92*
		't'	-	-	HE>ME≫LE	HE>ME≫LE	HE≫ME≫LE	HE>ME≫LE
Neuro-ticism	9+	F	0.30	0.88	1.19	0.75	0.88	0.33
		't'	-	-	-	-	-	-
	10+	F	0.45	0.92	0.76	0.56	0.21	0.73
		't'	-	-	-	-	-	-

** or≫ = 1% significance. * or> = 5% significance

6.24 Attainments : analysis of covariance with spatial reasoning.

Attainment scores were examined for covariance with spatial reasoning, amongst sex and personality groups at successive age levels. In each case criteria of spatial (non-verbal) intelligence and personality were derived from tests completed closely in time to the attainment test.

Covariances were not homogeneous, and in most cases the degree of disparity between groups is sufficiently high to suggest caution in interpreting subsequent analyses. In the event few 'F' ratios are significant.

Table 6.17 shows the 'F' ratios of the analyses of main effects and indicates patterns of significant differences. Tables in the statistical appendix present full summaries of the calculations of homogeneity and analysis of covariance, and show the multiple range 't' tests employed where 'F' reached significance. See statistical appendix. 213 - 236

Table 6.17 Summary of F and 't' ratios of attainment scores adjusted for covariance with spatial reasoning, for main effects : sex, extraversion and neuroticism.

		Spelling	Reading	Number	C/Vocab.	N.Prob.
Sex	9+ F	0.33	1.53	0.45	1.40	4.28**
	9+ 't'	-	-	-	-	B≫G
	10+ F	0.97	3.26	1.26	2.46	4.34**
	10+ 't'	-	-	-	-	B≫G
Extraversion	9+ F	7.41**	5.75**	5.66**	7.36**	4.73**
	9+ 't'	HE≫L	HE ME≫LE	HE≫ME≫LE	HE≫ME≫LE	HE≫ME≫LE
	10+ F	3.93*	4.82**	3.13*	5.63**	1.94
	10+ 't'	HE≫ME≫LE	HE ME≫LE	HE≫ME≫LE	HE≫ME≫LE	-
Neuroticism	9+ F	0.81	0.31	4.51*	0.21	2.92
	9+ 't'	-	-	LN≫MN≫HN	-	-
	10+ F	0.33	0.41	3.61*	0.40	2.84
	10+ 't'	-	-	LN≫MN≫HN	-	-

** or≫ = 1% significance. * or> = 5% significance

6.25 Attainments : association of extraversion and attainment within schools.

Data presented above indicate that only in relation to extraversion were significant relationships consistently revealed between attainment and personality. The degree of this relationship within schools was examined by chi-square, as two schools were too small for analysis this examination was restricted to schools A, D and E. Table 6.18 presents the chi-square for 2 x 2 contingency tables set up by differentiating the group in terms of an overall median split on personality and attainment. In school 'E' the association was much closer than others, in school 'A' little association was evident. In all 60 contingency tables but one, the tendency followed the overall trend for extraversion to be associated with attainment in all areas at each age.

Tables in the statistical appendix present the contingency tables in full. See statistical appendix. 243

Table 6.18 Summary of chi-square values for association of attainment and extraversion with schools A, D and E.

Test		School A	School D	School E
Spelling	8+	0.00	1.01	7.47**
	9+	0.76	0.58	13.55**
	10+	0.05	0.22	8.88**
Reading	8+	0.00	0.11	1.53
	9+	0.32	0.51	5.54*
	10+	1.69	0.23	4.04*
Number	8+	1.02	5.90*	5.04**
	9+	2.09	0.74	2.96
	10+	0.47	0.53	3.73
Comp/Vocab	8+	0.10	2.63	1.32
	9+	0.03	8.61**	4.44*
	10+	2.35	7.86**	0.37
Verbal Reasoning	8+	1.72	0.02	4.84*
	9+	0.05	0.52	6.13*
	10+	0.20	7.86**	7.90**
Numerical Problems	8+	0.00	3.05	3.91*
	9+	0.21	0.22	6.72**
	10+	4.21*	1.30	6.77**
Spatial Reasoning	8+	-	-	-
	9+	0.29	0.33	5.78*
	10+	0.97	3.30	8.00**

* = sig. 5% ** = sig. 1%

6.26 Attainments : linearity of association between personality and attainment.

Overall trends of the means at each year level were examined for linearity of regression of attainment on neuroticism and extraversion separately. Where significant departure from linearity emerged a further F test was conducted to check significance of curvature. Table 6.19 summarises the F ratios, the statistical appendix shows summaries of the analyses. See statistical appendix. 237-242

Table 6.19. Summary of 'F' ratios of tests of linearity : of trend of attainment of extraversion and neuroticism groups.

		Extraversion.		Neuroticism.	
		Linearity	Deviation	Linearity	Deviation
Spelling	8+	2.36	0.70	0.55	1.49
	9+	17.22**	0.31	0.03	1.23
	10+	5.26*	1.46	0.46	0.25
Reading	8+	0.72	1.70	0.88	0.01
	9+	10.57**	2.77	0.00	0.00
	10+	6.13*	4.01	0.10	2.05
Number	8+	8.29**	0.62	0.04	0.95
	9+	11.02**	0.85	6.66*	0.00
	10+	6.26*	1.53	0.21	1.18
Verbal Comp.	8+	5.26*	0.00	1.90	0.83
	9+	18.31**	1.05	0.64	0.20
	10+	10.60**	0.40	0.47	1.49
Verbal Reasoning	8+	4.68*	0.00	0.14	0.00
	9+	1.63	0.14	0.39	0.01
	10+	13.85**	0.04	0.18	0.38
Num.Prob.	8+	5.50*	1.74	0.09	0.00
	9+	11.85**	1.90	5.65*	0.05
	10+	9.80**	0.27	0.71	0.79
Spatial Reasoning	8+	-	-	-	-
	9+	3.96	1.26	0.51	0.14
	10+	13.13**	0.37	0.26	0.72

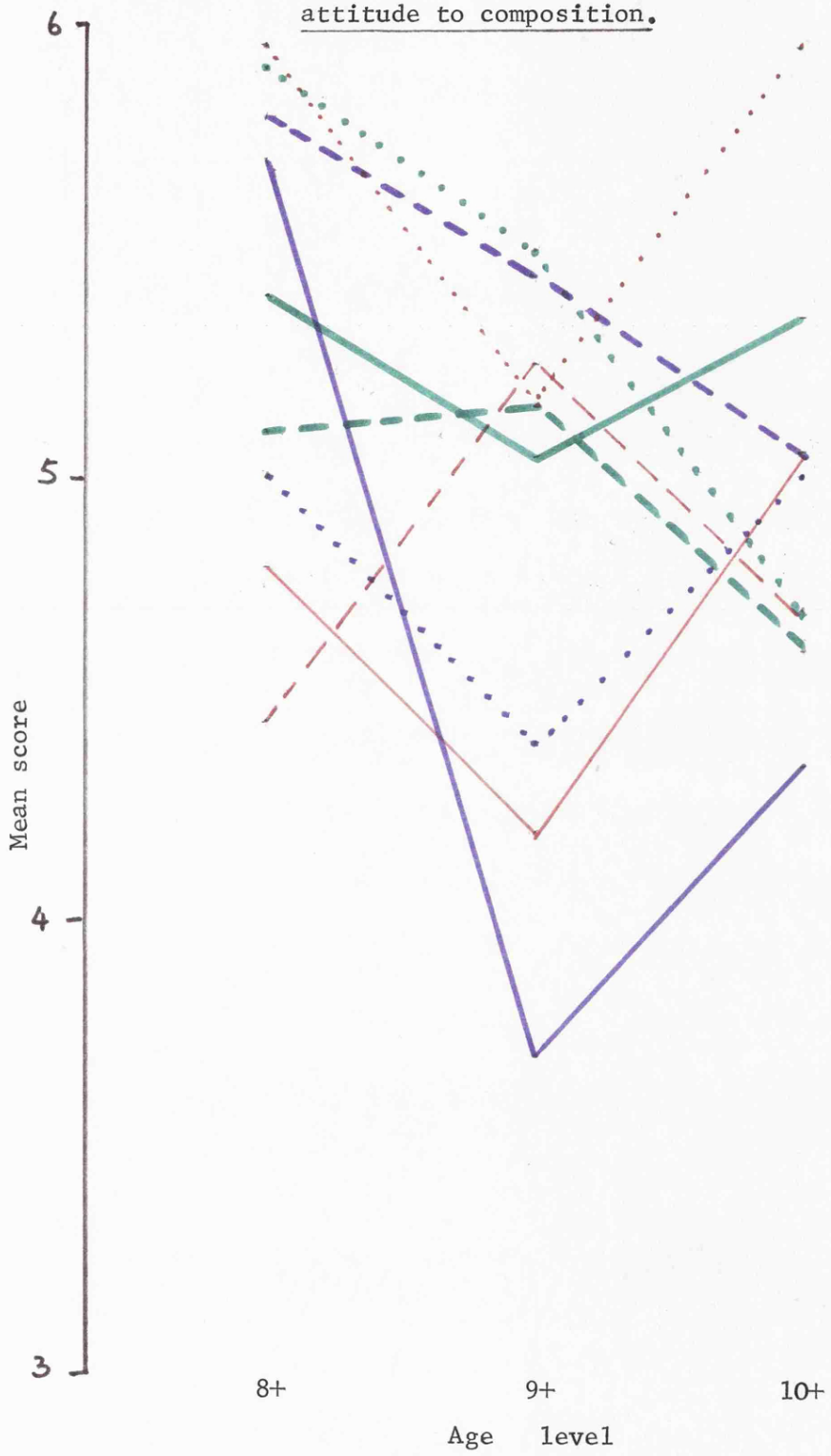
* = sig. 5% ** = sig. 1%

6.27 Attitudes towards curriculum : overall results

Attitude tests were repeated each year of the study for each child. Mean scores in each attitude area were calculated for each cell of the 3 x 3 matrix defined by personality levels of extraversion and neuroticism.

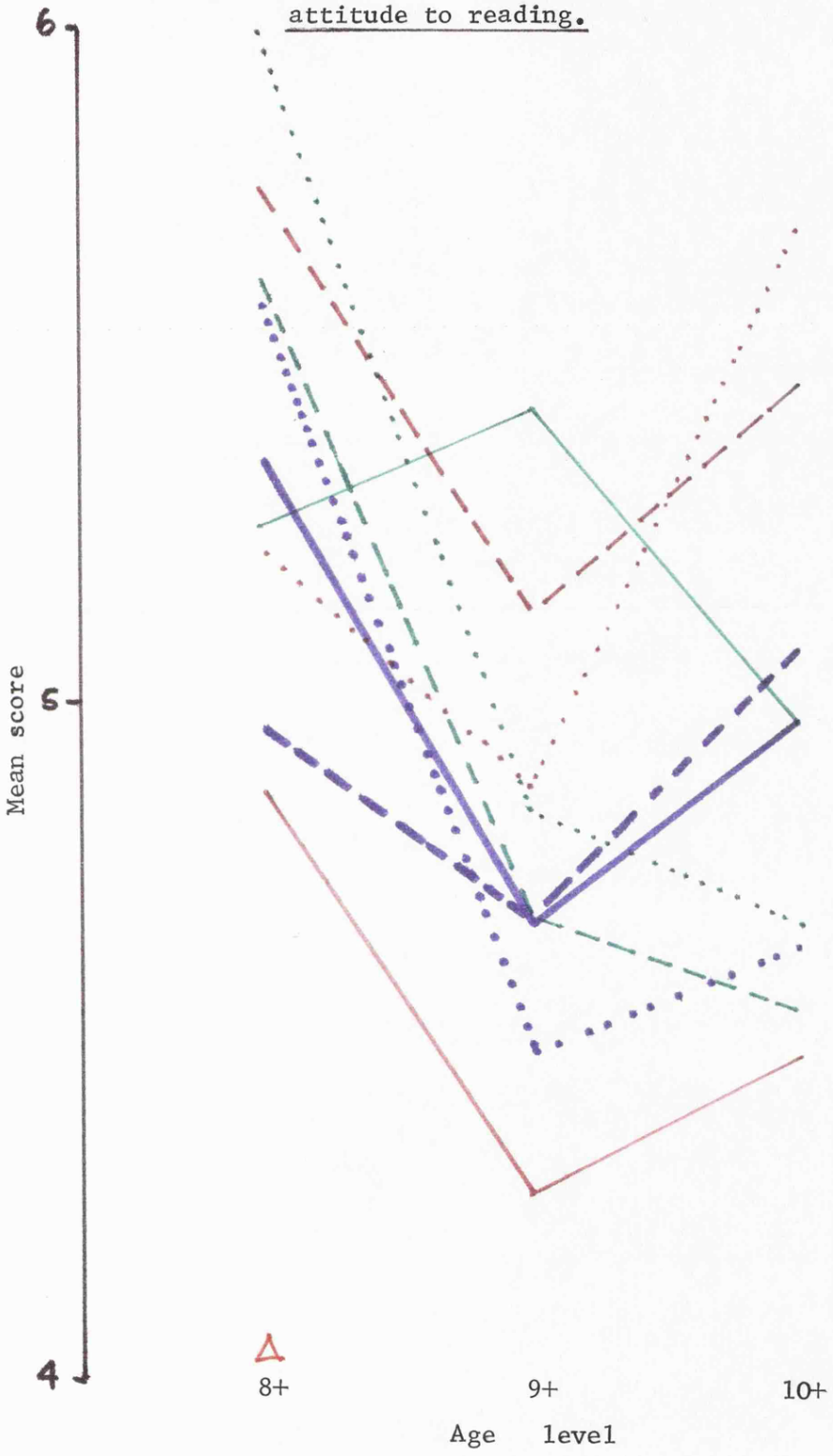
Tables 6.20 to 6.24 present the means in diagrammatic form, for boys and girls together. The statistical appendix presents data for sexes separately, in numerical form. See statistical appendix. 114- 138

Table 6.20 Diagram of mean scores of personality groups : attitude to composition.



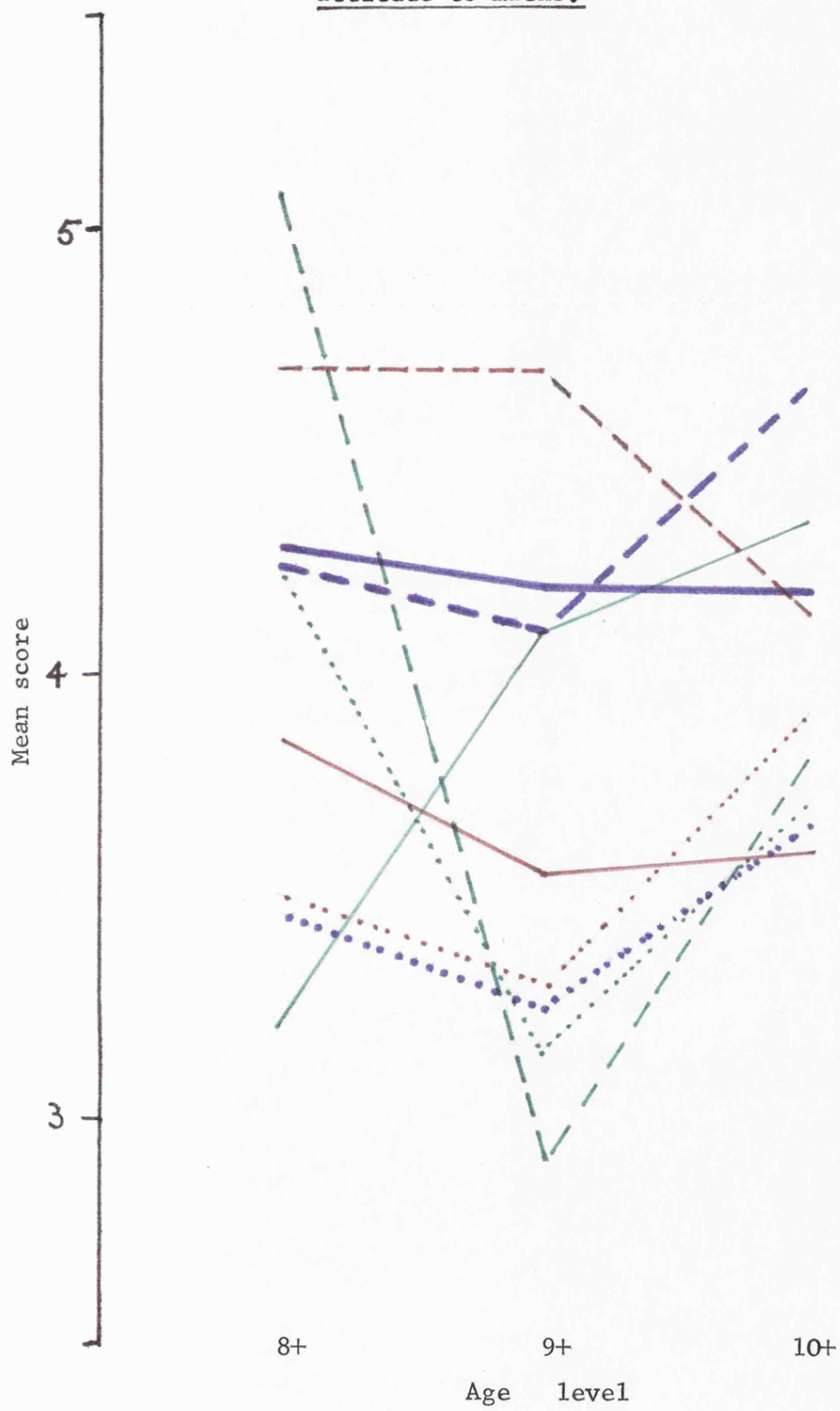
See statistical appendix tables. 114-117

Table 6.21 Diagram of mean scores of personality groups : attitude to reading.



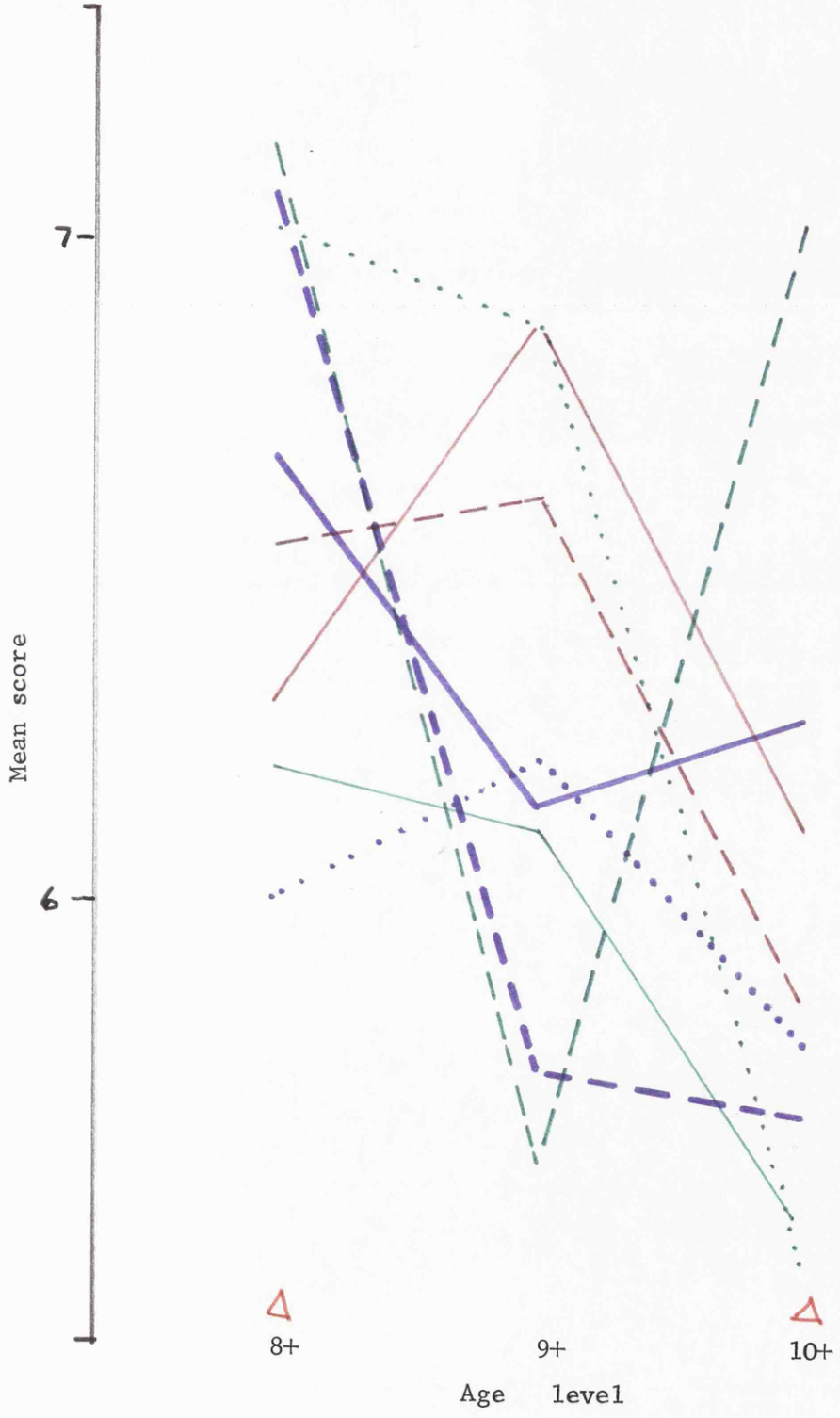
See statistical appendix tables. 118-122

Table 6.22 Diagram of mean scores of personality groups : attitude to maths.



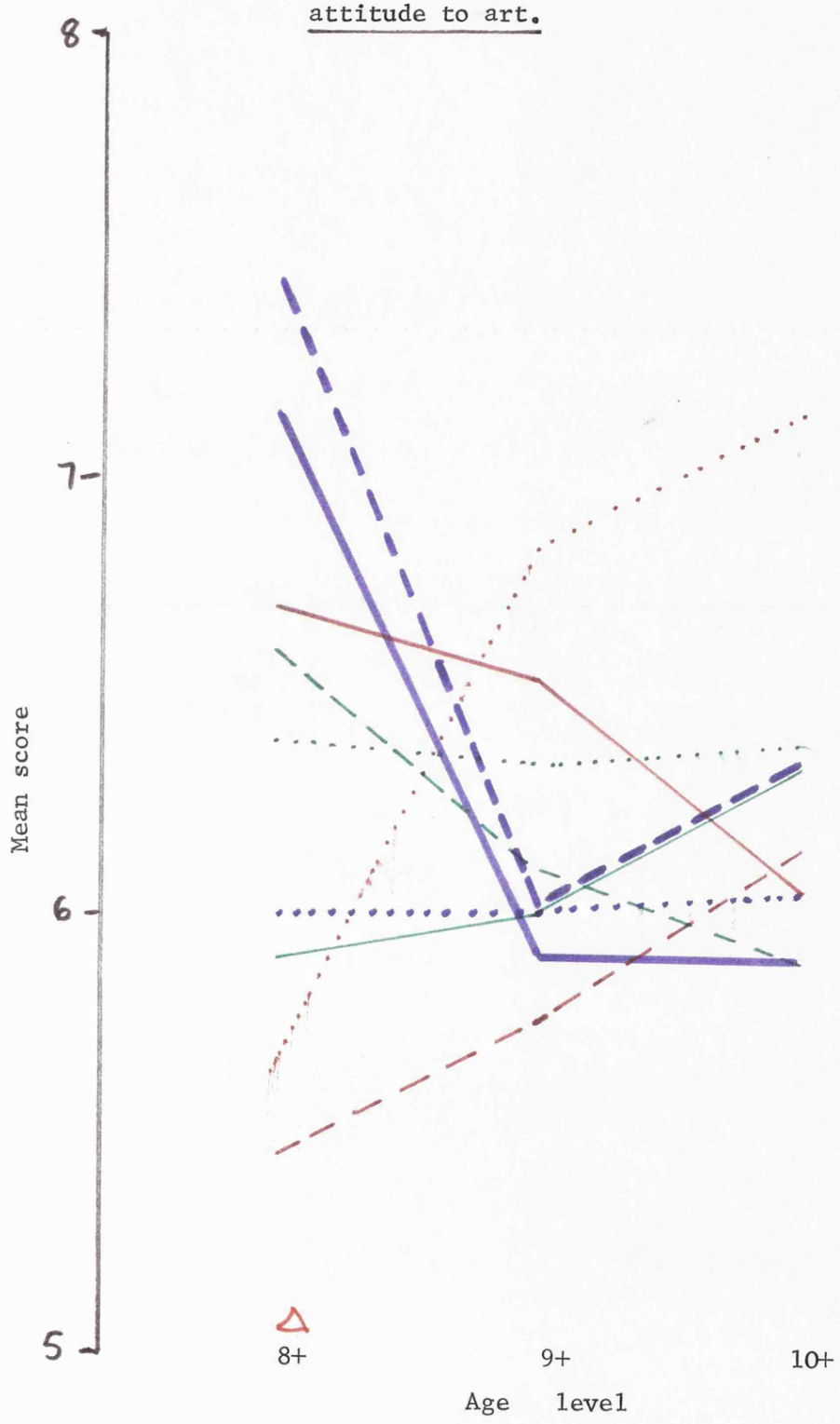
See statistical appendix tables. 123 - 126

Table 6.23 Diagram of mean scores of personality groups : attitude to P.E.



See statistical appendix tables. 127-132

Table 6.24 Diagram of mean scores of personality groups : attitude to art.



See statistical appendix tables. 133-136

6.28 Attitudes towards curriculum : analyses of variance.

Results from the attitude tests were subject to a 2 x 3 x 3 analysis of variance, in respect of sex and three levels of each of neuroticism and extraversion. At each year level the criteria for division into personality groups were derived from personality scores obtained closely in time to the attitude scores.

In general the analyses show little or no interaction between personality and attitudes towards curriculum, only 12 'F' ratios reaching significance. Table 6.25 summarises the 'F' ratios amongst means of sex, extraversion and neuroticism groups. The statistical appendix presents summaries of the calculations of 'F' and 't' tests, including those for interaction effects. See statistical appendix. 114-136

The overall trend, though slight, follows the commonly reported greater favouribility of attitudes amongst girls, and this appeared to interact with extraversion in three cases. Table 6.26 shows in diagrammatic form the means of boys attitudes towards reading, for extravert groups, showing sexes separately. Table 6.27 shows similar diagrams for Physical Education and Art.

Table 6.25 Summary of 'F' and 't' ratios of attitudes towards curriculum for main effects : sex, extraversion and neuroticism.

(** or ≫ = 1% * or > = 5%)

		Composition	Reading	Maths.	P.E.	Art
Sex	F 8+	6.49**	1.02	5.18**	5.13*	3.41
	't'	Girls≫Boys		Girls≫Boys	Girls≫Boys	
	F 9+	1.82	7.35**	1.84	0.02	0.92
	't'		Girls≫Boys			
	F 10+	0.04	3.84	0.37	0.80	2.09
	't'					
Extraversion	F 8+	0.39	1.02	0.06	0.69	2.70
	't'					
	F 9+	2.99	0.57	1.45	1.25	0.56
	't'					
	F 10+	0.11	1.83	0.46	0.14	0.28
	't'					
Neuroticism	F 8+	0.65	1.20	2.88	1.57	1.02
	't'					
	F 9+	2.94	0.23	2.96	1.15	0.59
	't'					
	F 10+	0.69	0.35	1.13	0.56	1.39
	't'					

Table 6.26 Means of attitudes of extraverts towards reading at 8+ : sexes separately.

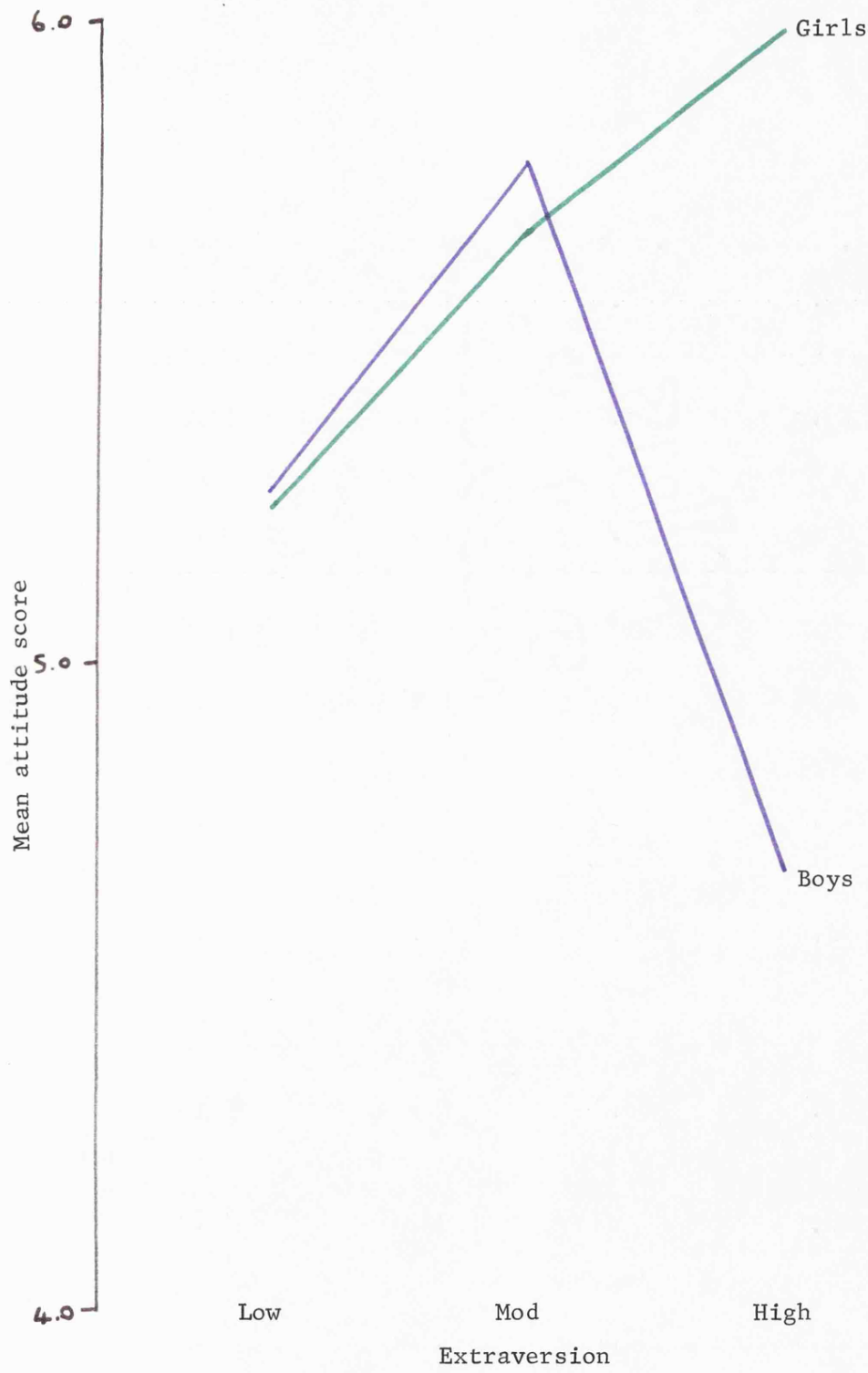
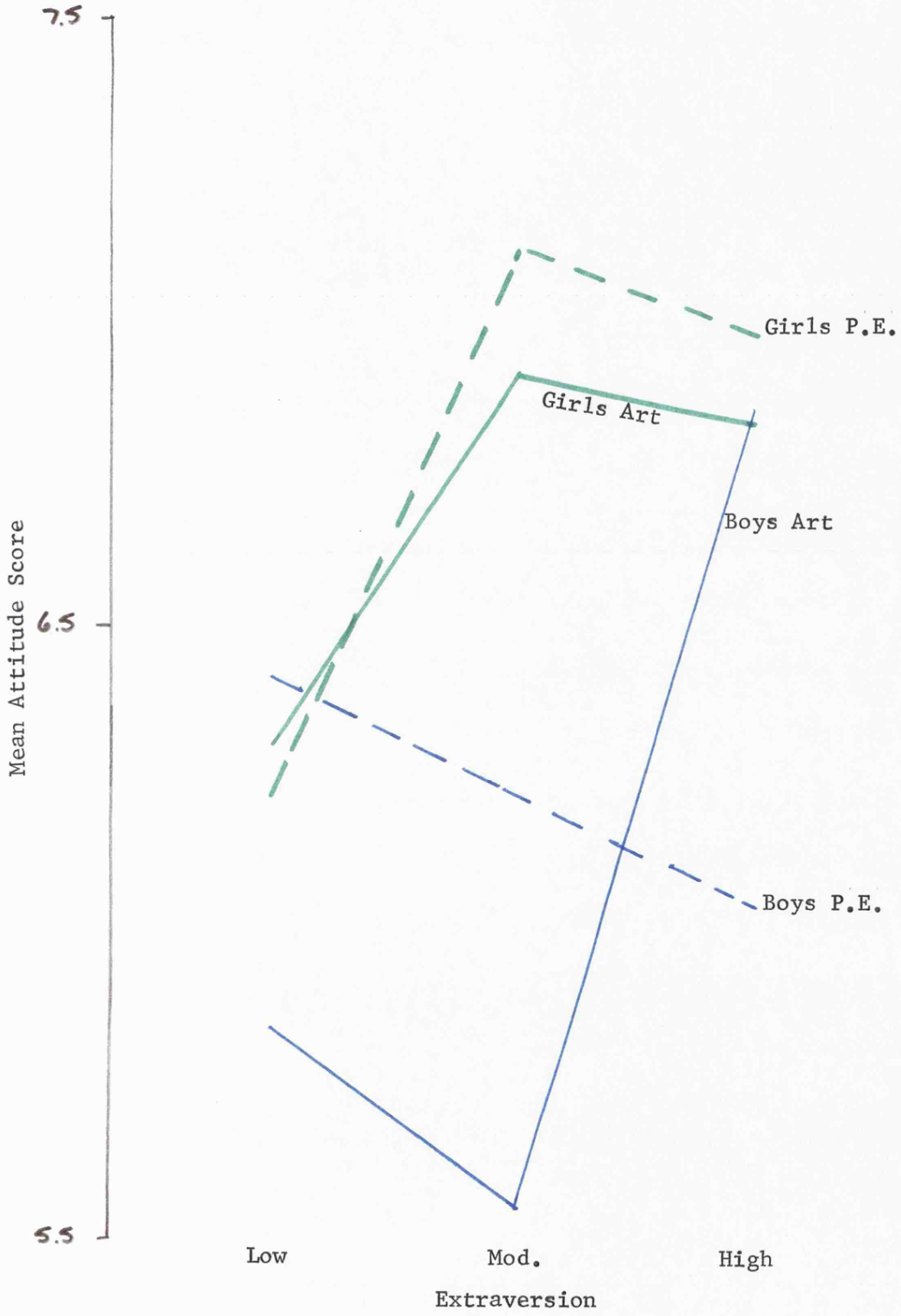


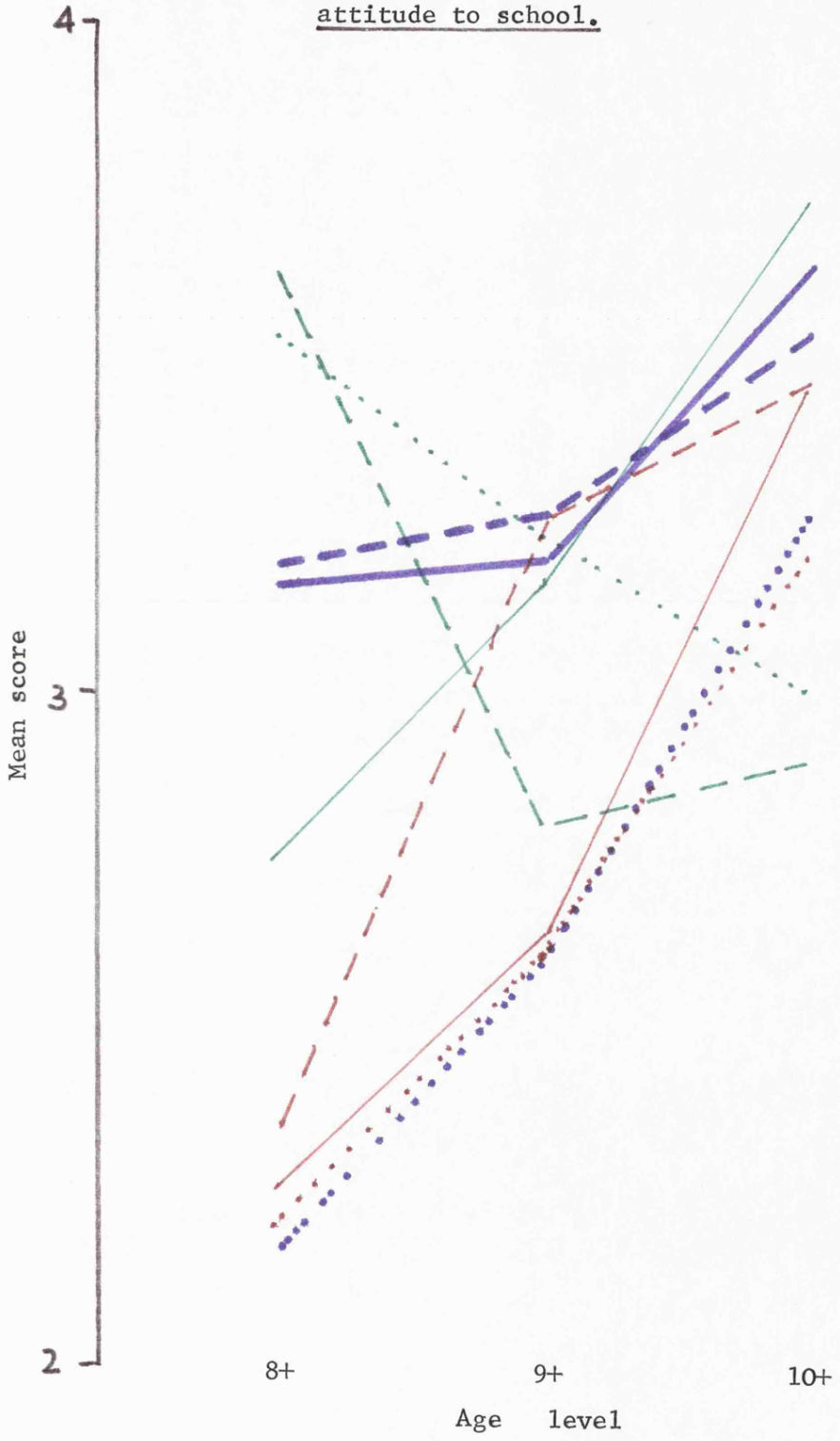
Table 6.27 Means of attitude of extraverts towards P.E. and Art at 8+ : sexes separately



6.29 Attitudes towards School : overall results.

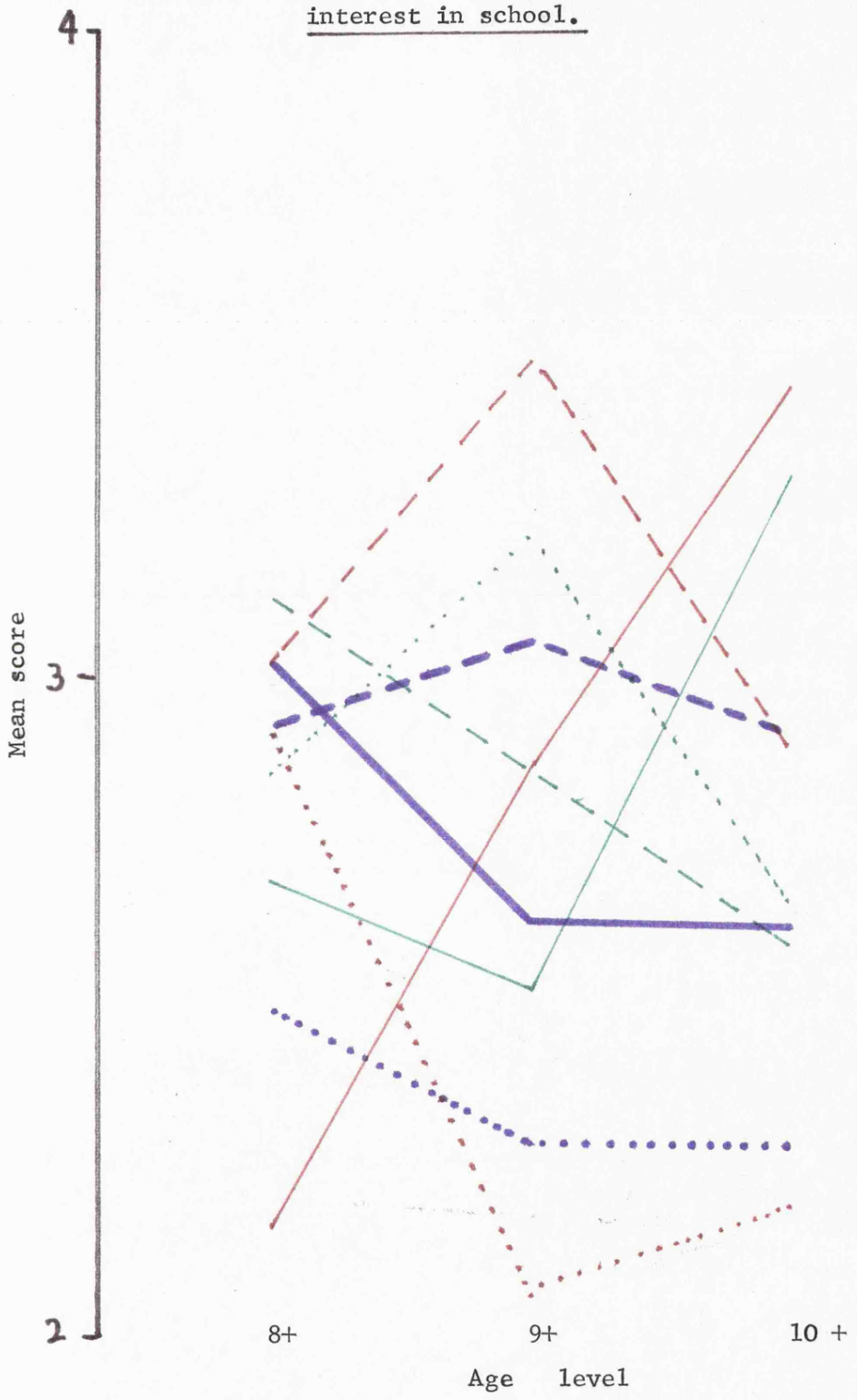
Tests of attitudes towards school were completed by the sample in each year of the study. Mean scores in each attitude area were obtained for each cell of the 3 x 3 matrix defined by personality levels of extraversion and neuroticism. Tables 6.28 - 6.37 present the means in diagrammatic form, for boys and girls together. The statistical appendix presents data for sexes separately, in numerical form. See statistical appendix. 139-194

Table 6.28 Diagram of mean scores of personality groups : attitude to school.



See statistical appendix tables. 139 - 142

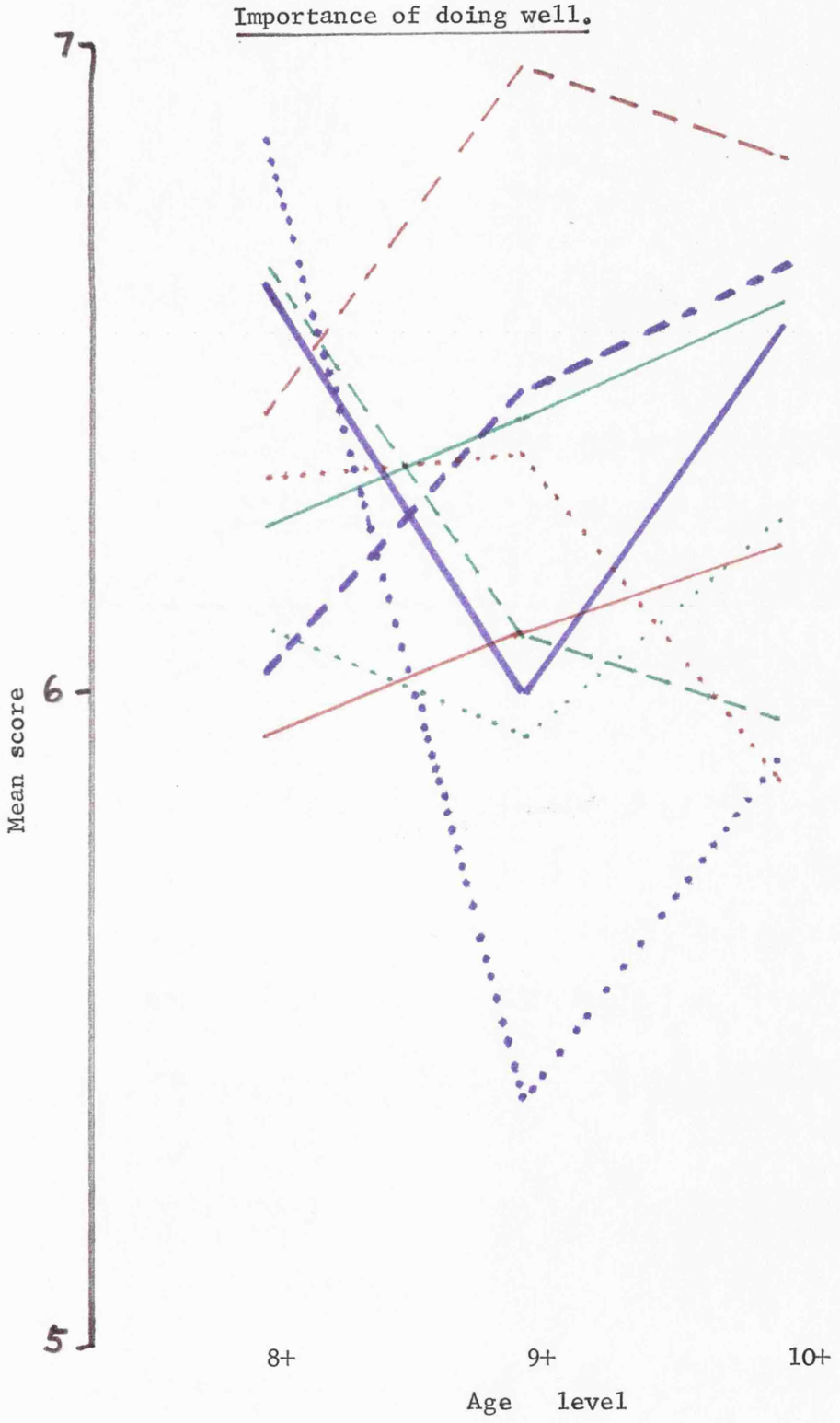
Table 6.29 Diagram of mean scores of personality groups : interest in school.



See statistical appendix tables. 143 - 146

Table 6.30 Diagram of mean scores of personality groups :

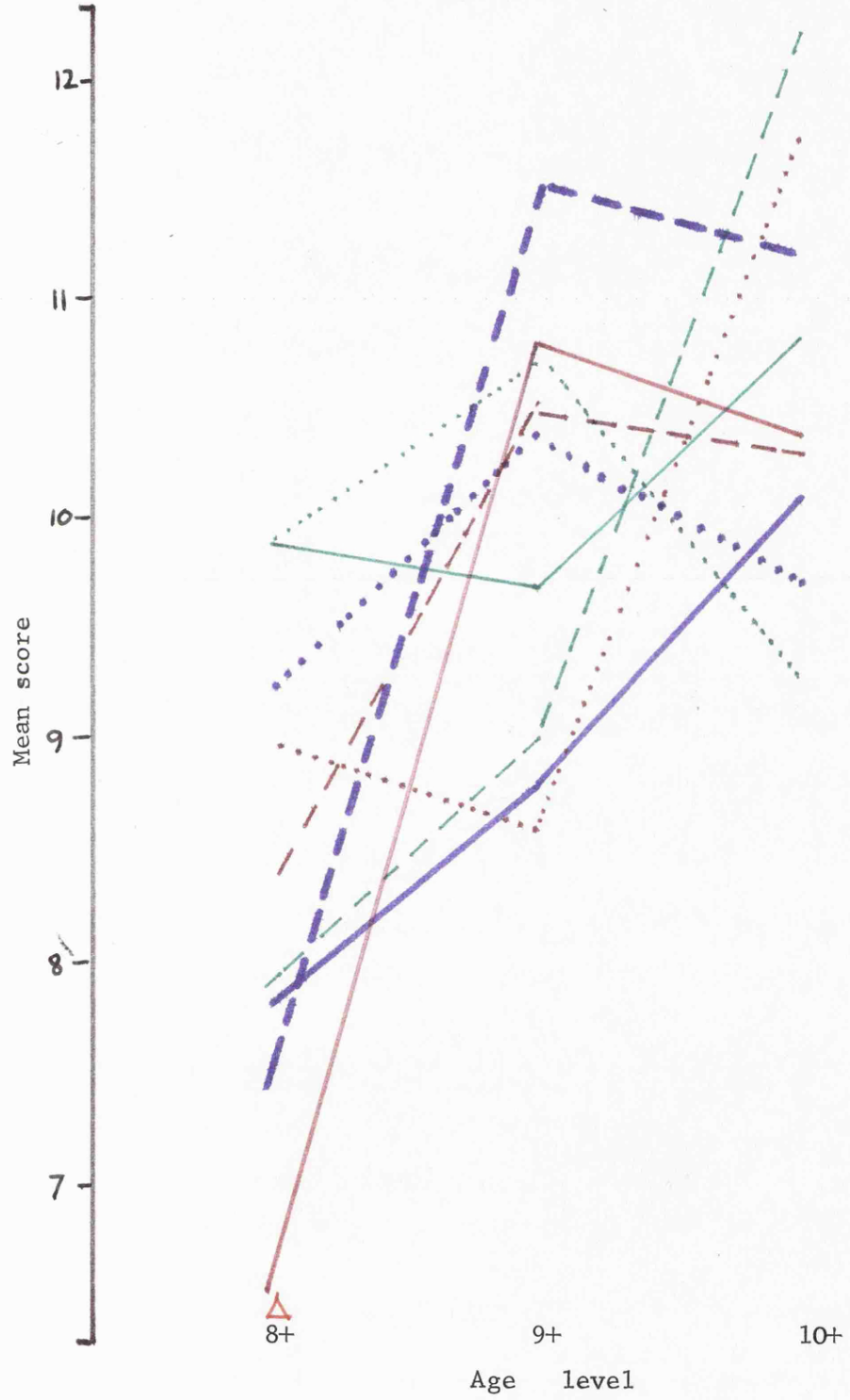
Importance of doing well.



See statistical appendix tables. 147-150

Table 6.31 Diagram of mean scores of personality groups :

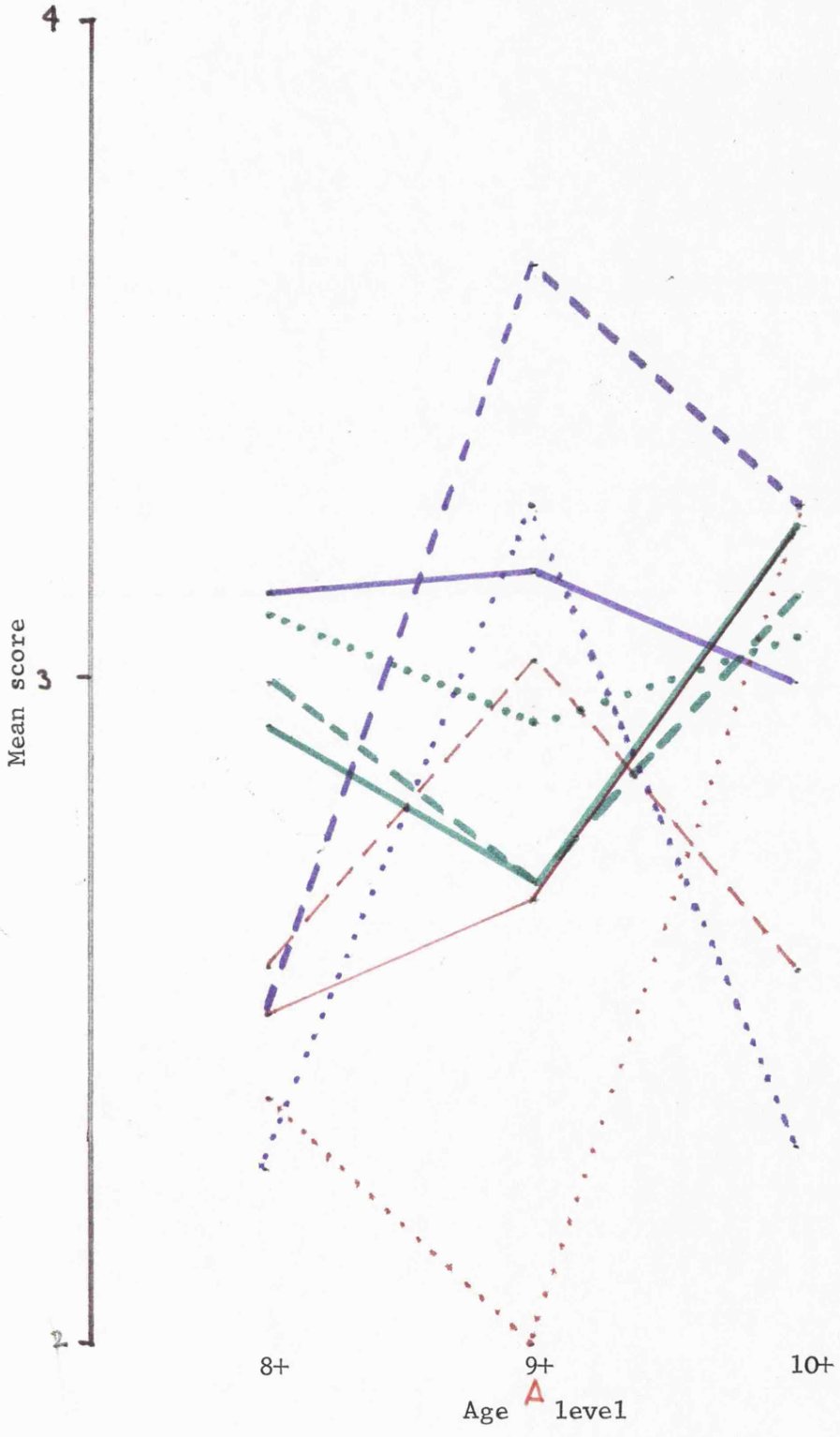
Attitude to Class



See statistical appendix tables. 151 - 155

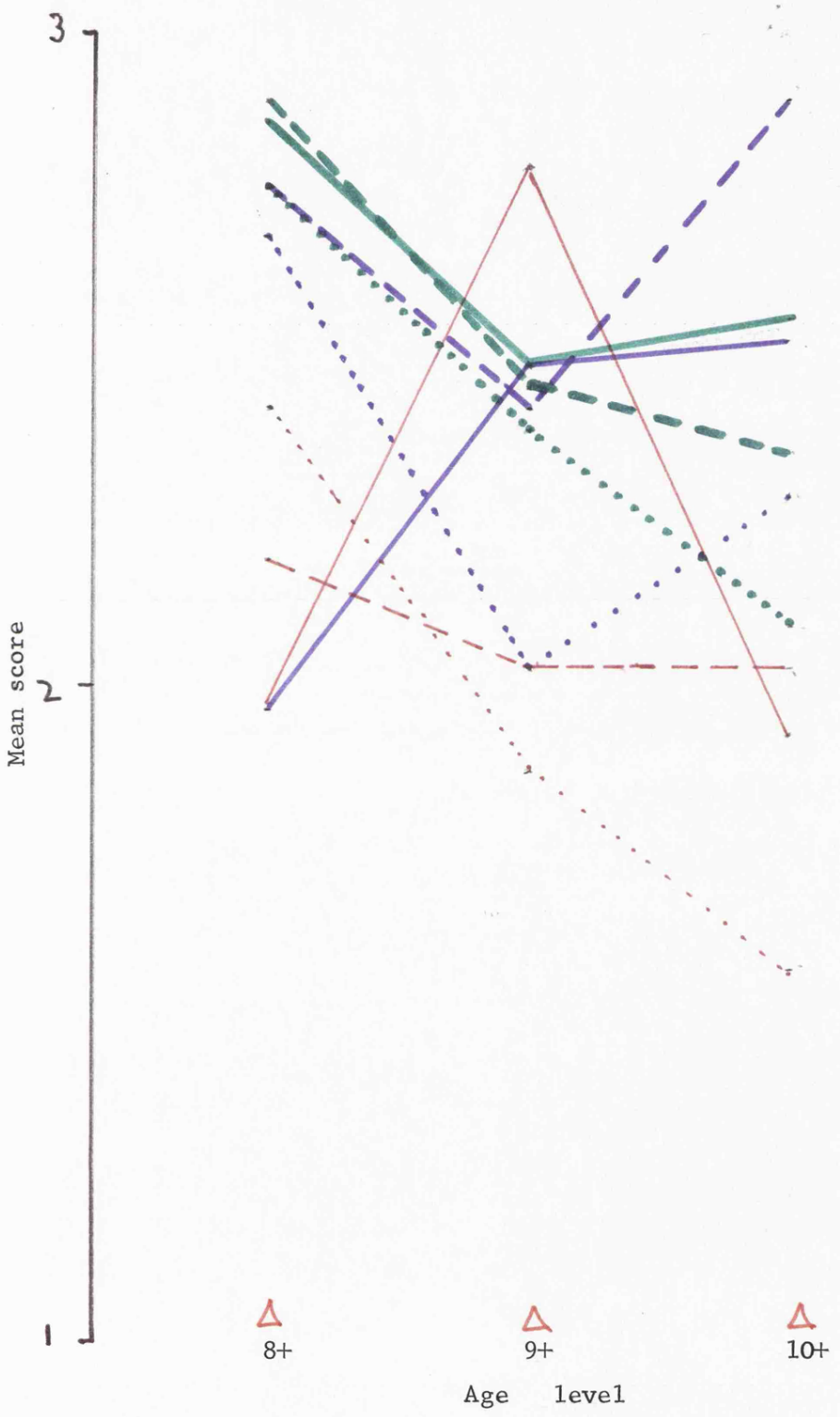
Table 6.32 Diagram of mean scores of personality groups :

'Other Image'



See statistical appendix tables. 156-160

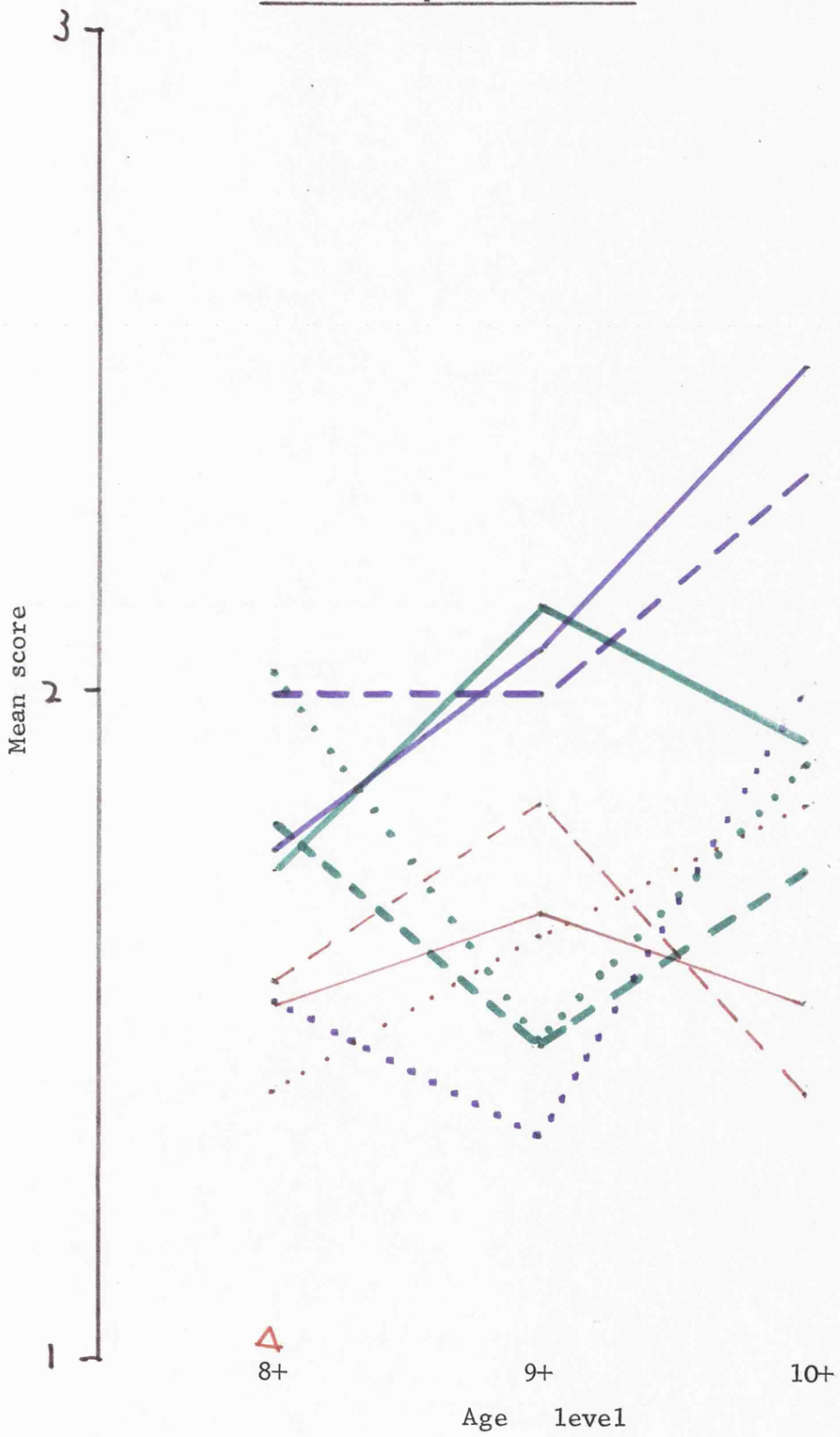
Table 6.33 Diagram of mean scores of personality groups : Conforming.



See statistical appendix tables. 161-167

Table 6.34 Diagram of mean scores of personality groups :

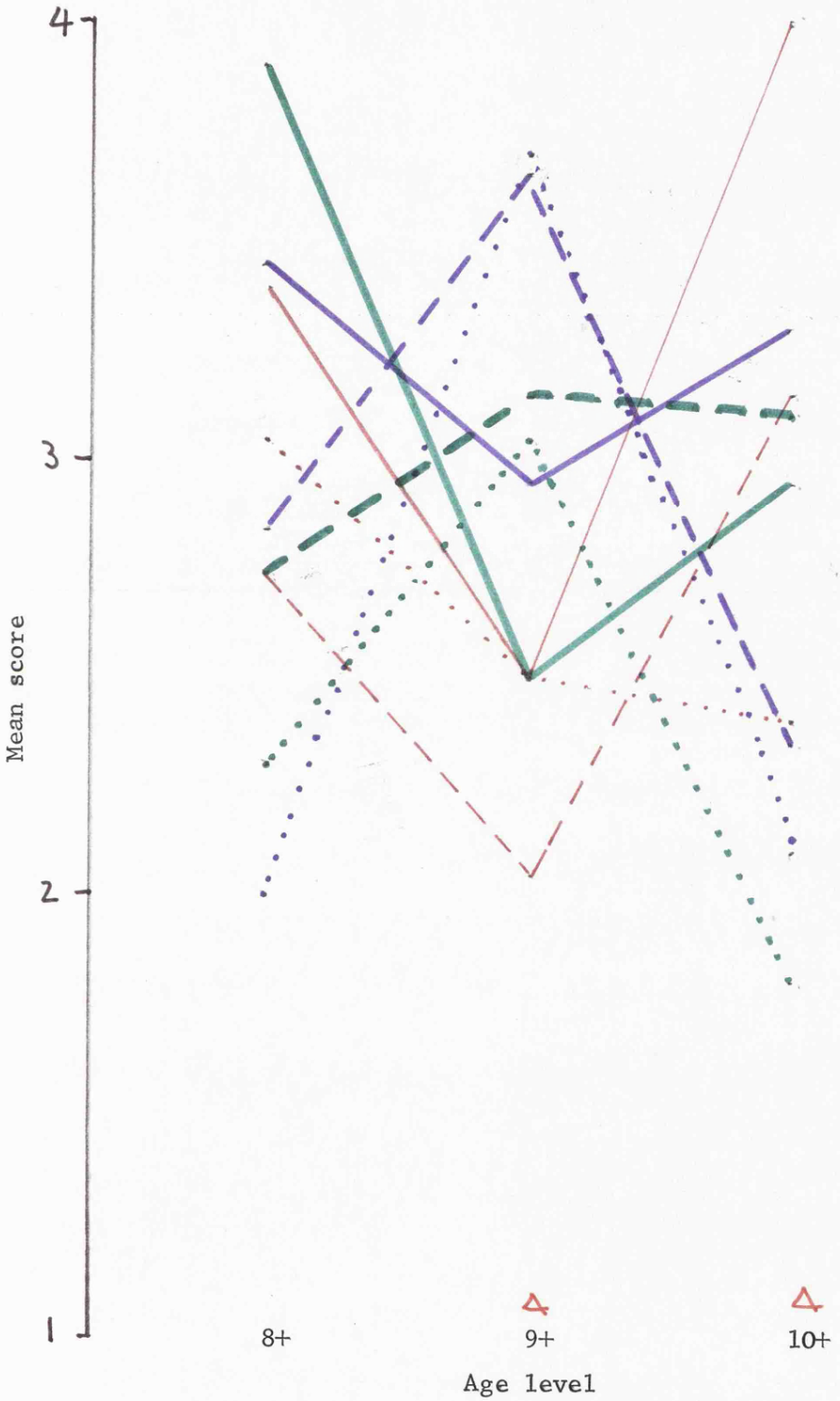
Relationship with teacher



See statistical appendix tables. 168-172

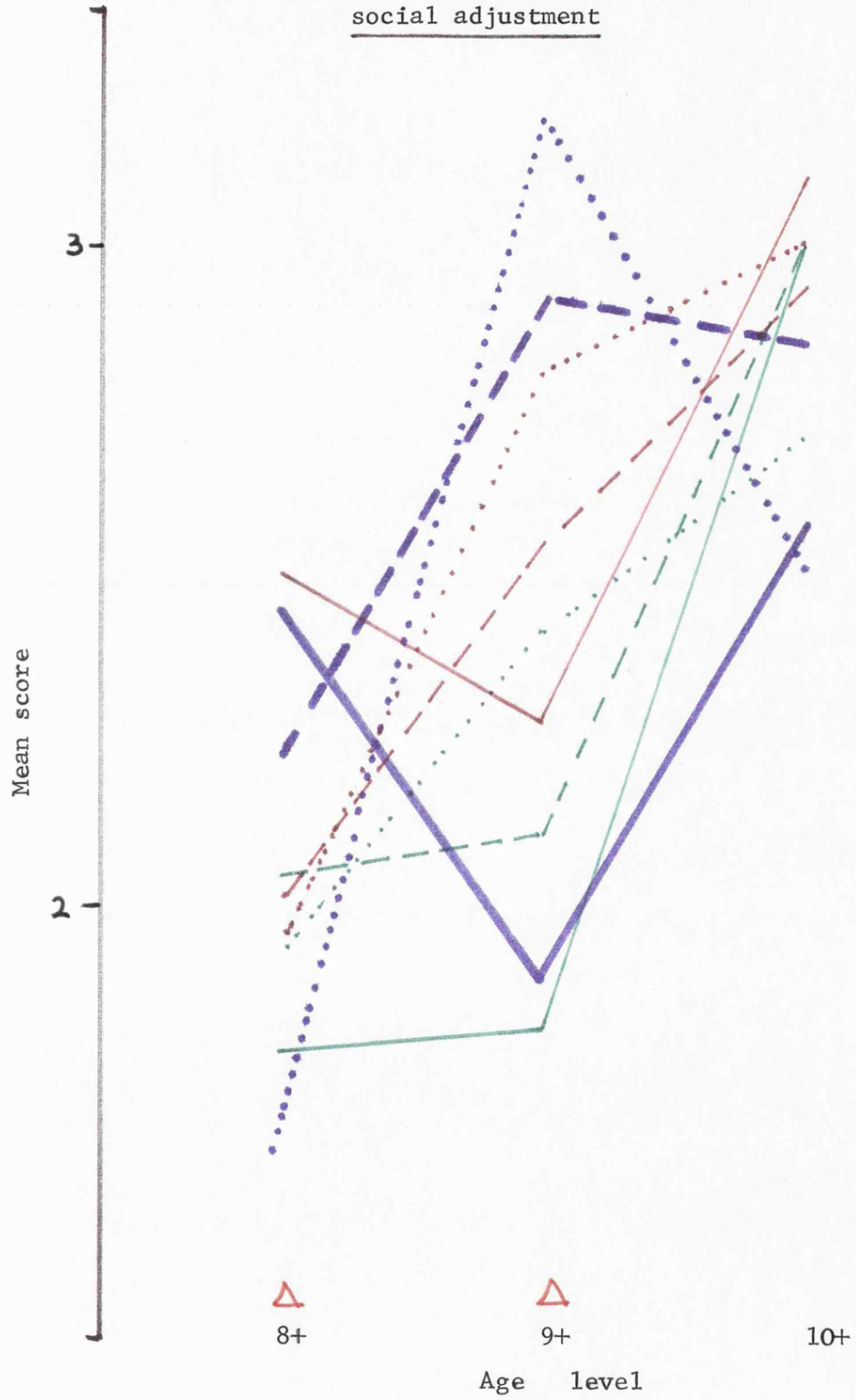
Table 6.35 Diagram of mean scores of personality groups :

Anxiety in class



See statistical appendix tables. 173-179

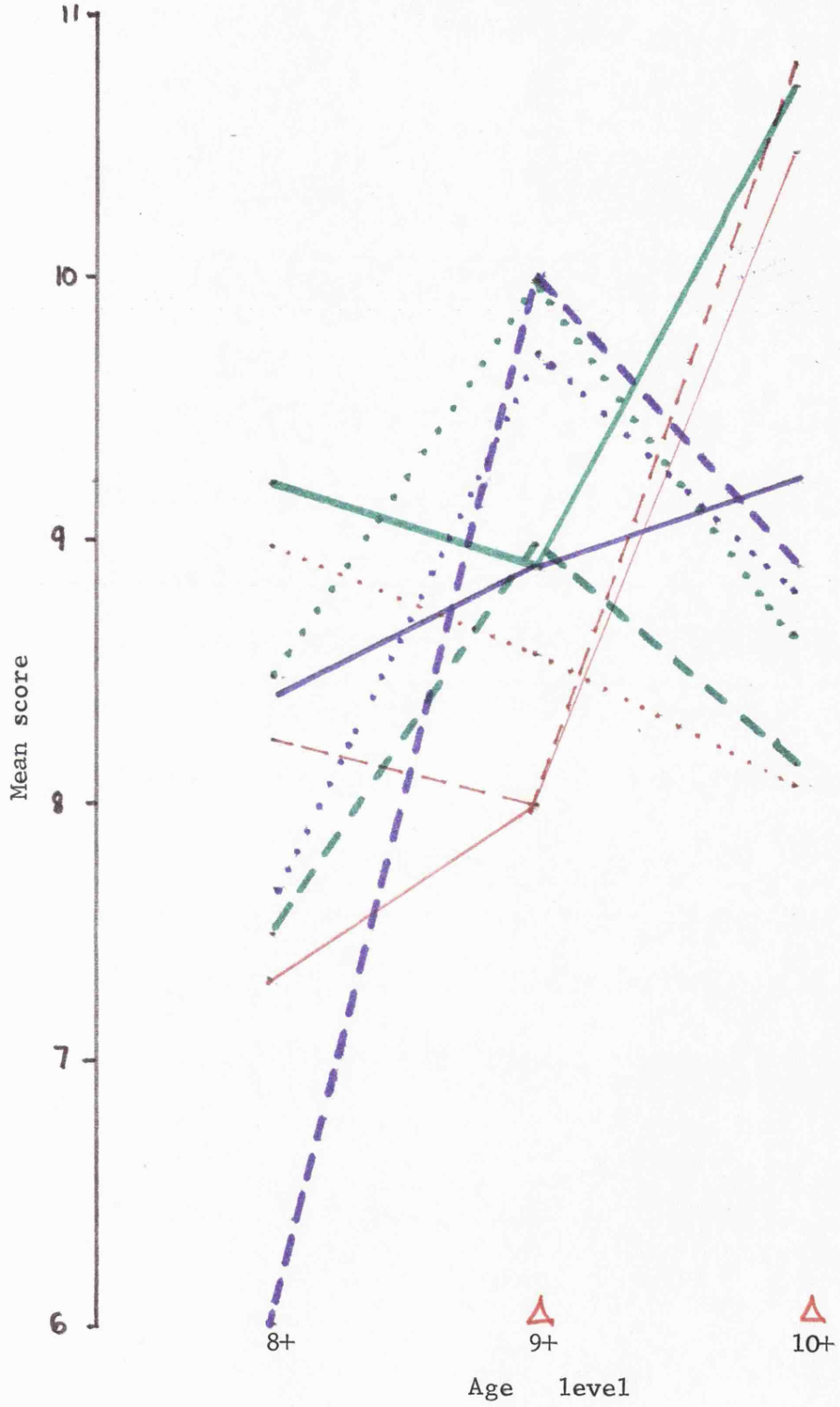
Table 6.36 Diagram of mean scores of personality groups : social adjustment



See statistical appendix tables. 180 - 186

Table 6.37 Diagram of mean scores of personality groups :

Self image



See statistical appendix tables. 187 - 194

6.210 Attitudes towards school : analyses of variance.

Results from the tests of attitudes towards school were subject to a 2 x 3 x 3 analysis of variance, in respect of sex, three levels of extraversion and three levels of neuroticism. At each year level the criteria for division into personality groups were derived from personality scores obtained closely in time to the attitude scores.

Table 6.38 shows the F ratios for main effects, and the statistical appendix presents full summaries of the analyses. In general terms the results indicate the superior attitudes of girls towards school, and to a lesser degree show stable introverts to hold more favourable attitudes than others. However few 'F' ratios, outside those involving sex differences, reach significance. See statistical appendix. 139-194

Table 6.38 Summary of 'F' and 't' ratios of attitudes towards school for main effects : sex, extraversion and neuroticism.

(** or ⋙ = 1% * or > = 5%)

		To School	Interest in School	Importance Doing Well	Attitude to Class	Other image
Sex	F 8+	35.25**	21.14**	15.63**	20.93**	14.19**
	't'	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys
	F 9+	48.21**	14.25**	10.23**	7.73**	4.46**
	't'	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys
	F 10+	15.38**	10.65**	6.77**	11.05**	10.40**
	't'	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys	Girls⋙Boys
Extraversion	F 8+	1.09	0.05	0.09	2.59	2.35
	't'					
	F 9+	0.68	0.58	0.98	0.02	8.65**
	't'					L⋙M H
	F 10+	0.68	0.41	0.22	0.13	0.77
	't'					
Neuroticism	F 8+	1.19	0.49	0.03	4.18*	1.33
	't'				H⋙L M	
	F 9+	0.06	0.60	0.98	0.24	1.83
	't'					
	F 10+	1.08	2.25	1.38	2.31	0.50
	't'					

Continued ...

		Conforming	Rel. with Teacher	Anxiety in Class	Social Adj.	Self Image
Sex	F 8+	44.70**	28.61**	0.29	0.81	0.57
	't'	Girls≫Boys	Girls≫Boys			
	F 9+	25.49**	33.95**	2.60	2.51	0.01
	't'	Girls≫Boys	Girls≫Boys			
	F 10+	38.99**	15.77**	0.14	13.18**	0.04
	't'	Girls≫Boys	Girls≫Boys		Boys≫Girls	
Extraversion	F 8+	0.95	3.90*	1.16	0.54	0.42
	't'		L≫M≫H			
	F 9+	0.56	2.16	10.72**	4.04**	5.11**
	't'			L≫M≫H	L≫H≫M	L M≫H
	F 10+	5.11**	0.39	4.54*	1.63	1.66
	't'	L≫M≫H		H≫M≫L		
Neuroticism	F 8+	0.34	0.61	6.01**	1.88	0.64
	't'			L≫M≫H		
	F 9+	1.32	0.07	2.21	7.04**	2.25
	't'				H≫M≫L	
	F 10+	3.07	2.38	18.72**	0.64	5.66**
	't'			L≫M≫H		M≫H≫L

Chapter 7.

Discussion of results.

The results and analyses presented in chapter 6 were examined in relation to the hypotheses detailed in chapter 3. Each hypothesis is represented in this chapter and results are reviewed in relation to these. At the close of each section an overview discusses the relationship of the findings of previous research with those obtained here. Within each section reference is made to the location of data used in testing the hypotheses, citing appropriate table numbers.

7.1 Personality and junior school children : results and hypotheses.

Eight hypotheses were examined in relation to personality and junior school children, each is discussed below.

7.11 Trends of extraversion.

H.1. "Extraversion mean scores are higher for older than for younger junior children."

Data : Tables: 4.3,

Statistical appendix: 1,2,3,65,

There is an overall trend in the hypothesised direction, the difference between means at 9+ and 10+ being significant ($p<.05$). The commonly reported pattern of increase in extraversion score with age holds good for this sample, the hypothesis is retained.

7.12 Trends of neuroticism.

H.2. "Neuroticism mean scores are higher for older than for younger junior children.

Data : Tables: 4.3,

Statistical appendix: 1,2,3,65,

Whilst the overall trend is as hypothesised a levelling of scores occurred at 9+, girls especially showing a tendency to maintain rather than increase in neuroticism score. No differences between years are significant here. Whilst the hypothesis can be retained by inspection of the absolute differences, the scale of such differences indicates that at age 8+ to 10+ there is something of a plateau in J.E.P.I. neuroticism scores.

7.13 Neuroticism and sex differences.

H.3. "Neuroticism mean scores are higher for girls than for boys amongst junior children."

Data : Tables: 6.2,

Statistical appendix: 65,

At no age level did sex differences in neuroticism reach significance, it is concluded that scores at this stage are closely similar for both sexes and the hypothesis is rejected.

7.14 Extraversion and sex differences.

H.4. "Extraversion mean scores are higher for boys than for girls amongst junior children."

Data : Tables: 6.1,

Statistical appendix: 65,

Boys are consistently higher in extraversion, as hypothesised, at 8+ this superiority is significant ($p<.01$). Other differences are not so great and, whilst the absolute differences support the hypothesis, the trend is for differences between sexes to diminish.

7.15 Stability of extraversion classifications.

H.5. "Junior school children classed as of high, moderate or low standing in extraversion at 8+ are similarly classed at 9+ and 10+.

Data: Tables: 6.3,
Statistical appendix: 65,

Coefficients of $r = .55$ and .51 were found between extraversion scores over a one year interval, suggesting that only some 28% of the variance of an individual score might be accounted for by the previous year's data. This low level of stability at individual level is reflected in the subsequent convergence of groups initially classed as being at different personality levels. Whilst the means of the groups remain significantly different at each age level ($p < .01$) they do not maintain the degree of definition obtained by re-classification. Several explanations may be advanced for the observed levels of correlation from one year to another, stressing the error margin of the tests or the variability of personality measures at this age, or again the fluid character of personality at this stage. The results must emerge from an interaction of all these effects, rejecting the hypothesis.

7.16 Stability of neuroticism classifications.

H.6. "Junior children classed as of high, moderate or low standing in neuroticism at 8+ are similarly classed at 9+ and 10+.

Data : Tables: 6.4

Statistical appendix: 65

Here again the scores of groups initially classified as distinctive in personality at 8+ tend to converge and lose definition progressively at 9+ and 10+. The hypothesis can be rejected as the data indicate a degree of variability of personality scores which renders it impossible to determine stable groups at this stage ($r = .53$ and .52). This result, together with that at 7.17 above, casts doubts on longitudinal studies based on single personality measures, the scores obtained at the age levels considered here do

not have the characteristics of organismic variables as is sometimes assumed. The sample means for neuroticism are lower than those given in the norms, and it may be that this factor is related to the level of variability observed here, neurotics being perhaps more variable in score. Whatever the reason for the fluctuation observed, the inferences for research are clear. Either personality tests should be repeated, and children re-classified at regular intervals in longitudinal studies, and the levels of variability should be fully explored in studies using a single personality criterion. It may be that at the junior stage personality, or more accurately self reported behaviour indicative of personality, is more heavily influenced by other factors than has been suspected. Studies are required to examine this problem in greater detail, considering variables associated with particular patterns of change.

7.17 Changes in extraversion amongst high attainers.

H.7. "Extraverted junior children who are high in attainment will tend to become increasingly introverted with age in relation to their peers.

Data : Tables: 6.5, 6.7,

Statistical appendix: 65

The analyses of the subsequent extraversion scores of children classed as extraverts at 8+ show both high and low attainers to have similar patterns of change, all differences are insignificant ($p \geq .05$). High attainers remain higher in extraversion and do not show a tendency towards introversion. The hypothesis arose from the view that the 'crossover' effect might, in part at least, be accounted for by changes in measured personality amongst able children responding to

different school and learning regimes more suited to introvert behaviour. It may well be that such trends do exist at later ages when schooling patterns change more noticeably at the secondary stage, however the results here do not evidence such a trend and the hypothesis is rejected.

7.18 Changes in neuroticism amongst high attainers.

H.8. Stable junior children who are high in attainment will tend to become increasingly neurotic with age, in relation to their peers."

Data : Tables: 6.6, 6.7,

Statistical appendix: 65,

Analysis of neuroticism scores here showed that whilst both groups increased in neuroticism from 8+ to 9+, at that age the mean of the low attainers remained level whilst that of high attainers continued to rise ($p<.01$). This trend is as hypothesised, and may be evidence of more able children becoming increasingly concerned and anxious in response to schooling experiences which are increasingly restricting and demanding. It would be necessary to carry the longitudinal study further to show how far these changes are related to age and schooling, and to what extent the trends persist. The hypothesis is retained.

7.19 Personality : review of results.

The most notable aspect of the results relating to personality is the degree of variability detected in the scores. In general trend the sample scores followed those given in the manual (Eysenck. 1965), but the extent to which individuals showed changes in score was considerably greater than had been suspected. Some inferences

of this finding have been discussed above, it seems that scores from such inventories can only be employed to define broad groups at this stage with any degree of confidence. Even when groups are defined, changes in score bring about a marked regression-to-mean effect. Previous studies which have used only one personality test and have related those scores to subsequent data probably underestimate the effects of personality. The greater the time between testing the greater the probability of this error, and previous research findings might be reviewed in the light of this unsuspected source of variance.

Only slight systematic variability was identified, the trend for stable high attainers to increase in neuroticism. It is possible that this is a result of children learning to exhibit behaviour more associated with concern and anxiety in relation to schooling. Perhaps Mabberley's (1946) view of personality as an interactive concept is reflected here, environmental influences having affected the behaviour patterns reported by the children (Allport.1963).

The inferences of changes in personality resulting from educational environment are wide ranging. Probably these patterns of change are fortuitous, a casual unplanned effect of particular teaching styles and climates rather than a purposeful modification of individual personalities. If this is so, then the direction and extent of these casual influences should be carefully explored; firstly to identify the origins of the changes in personality and secondly to consider the value judgements which must be made if changes in personality are to be a conscious element of education. Evidence here suggests that whether conscious or no,changes in personality are related to schooling, and some at least of these changes appear systematic. The problem posed for the classroom is to determine how such changes come about, and to what extent the school is justified

in effecting specific patterns of change. Problems posed for research include the measurement of personality at this stage and the need for careful scrutiny of results and definition of personality groups.

Results here may indicate actual changes in personality, or errors in test instruments and measurement. Whatever the origins of the results the implications for education are that it is necessary to go beyond present assumptions in this area, to identify the factors giving rise to the findings here.

Chapter 7.

Discussion of results.

7.2 Personality and attainment amongst junior school children : results and hypotheses

Fourteen hypotheses were examined in relation to personality and attainment amongst junior school children, each is discussed below.

7.21 Attainment and extraversion

H.9. "Attainment mean scores of extravert junior children are higher than those of introverts."

Data : Tables 6.8 to 6.15,

Statistical appendix 66 to 113

Results tend to confirm this hypothesis at each age level, although the association is less strong at age 8+, where significant superiority is observed only in the case of number and numerical problem solving. At age 9+ the superiority is significant in all attainments except spatial reasoning, at 10+ the superiority is significant in all areas. In the case of spelling and number the superiority of extraverts is a little less marked at 10+ than 8+, perhaps indicating that the superiority of extraverts rises to its highestat 9+. It is interesting to note that amongst the older children the attainment scores of moderate and highly extravert groups move more closely together, indicating an inferiority of introverts rather than a superiority of extraverts as a group. These results follow the general patterns suggested in previous research and may be accounted for in one of two ways; either there is a constitutional association of extraversion and ability to achieve at this age (and the extraverts show superiority in both ability and attainment), or the patterns of schooling at this age favour extraverts through active, open ended,

verbal and individual methods. From the results in this section it is not possible to indicate which account of the evidence is most probable. Subsequent findings here support the second suggestion and this is returned to below.

In general the results agree well with previous research and the hypothesis is confirmed.

7.22 Attainment and neuroticism

H.10. "Attainment mean scores of stable junior children are higher than those of neurotic children."

Data : Tables 6.8 to 6.15

Statistical appendix 66 to 113

Evidence here is much more complex and less distinct than that relating to extraversion, the patterns of regression fluctuating considerably whilst amongst ambiverts stable children are consistently superior, elsewhere only in number at 9+ does a significant trend in the hypothesised direction emerge. Present evidence does not support the hypothesis, which is rejected; the more complex patterns identified in respect of neuroticism are referred to below. The absence of general trend could be related to the nature of the attainment data, as previous researchers (Grimes 1961, McCoy 1965.) have suggested that neurotics may be superior in test conditions. On the other hand the present results confirm those of Savage, (1966) and McCandless, (1956). Amongst the sample of this study neuroticism is of considerably lesser significance than extraversion as a factor in attainment.

7.23 Attainment and extraversion : relationships with age

H.11. "The superiority of extravert children in attainment at 8+ is more marked than that obtaining at 10+."

Data : Tables 6.8 to 6.15

Statistical appendix 66 to 113

Whilst the general trend for extraversion to be associated with success has been noted, this differs with age. Amongst the younger children extraverts were superior only in number and numerical reasoning, in other areas no significant differences emerge. Earlier learning in schools may be less verbal and not so dependent on extravert characteristics, or it may be that teachers of younger children do not demand adjustment to the curriculum on the part of the child, as may be the case later. A superiority of extraverts does emerge in almost all areas of attainment at 9+, but diminishes slightly at 10+, where the trend can more properly be seen as inferiority of introverts. The slight trend away from extravert superiority here may be indicative of the beginning of the cross-over effect to a superiority of introverts at 13+ (Rushton.1969). In general terms the present results indicate a 'peak' of extravert superiority from 9+ to 10+, although in the absence of evidence from younger children it is not possible to relate this intriguing result to other data. Certainly a dynamic interaction between age, personality and attainment is evidenced rather than the simple association identified by cross-sectional surveys.

The hypothesis is clearly rejected. It was based on evidence of a decline in superiority of extraverts amongst older pupils, a phenomenon which was simply projected backwards. Evidence here confounds such a hypothesis and indicates that a more appropriate one would suggest that the superiority of extraverts in attainment is most notable from age 9+ to 10+.

7.24 Attainment and stability : relationships with age

H.12. "The superiority of stable junior school children in attainment at 8+ is more marked than that obtaining at 10+."

Data : Tables 6.8 to 6.15

Statistical appendix 66 to 113

In the absence of significant differences at either 8+ or 10+ this hypothesis must be rejected, moreover the premise of general superiority of stable children has been rejected. (see 7.22). The hypothesis was based on a similar projection to that employed in H.11., again no confirmation can be found. It appears that the 'crossover' in respect of neuroticism is an effect associated with fluctuations emerging after primary schooling. At younger age levels interest in this area is associated with the regression curves rather than with absolute differences, this is returned to below.

7.25 Attainment and introversion : relationships with age

H.13. "The inferiority of introvert junior children at 8+ is more marked than that obtaining at 10+."

Data : Tables 6.8 to 6.15

Statistical appendix 66 to 113

In general terms this hypothesis is confirmed by the results. Whilst few significant differences emerged at 8+ all actual differences showed introverts to be inferior in attainments, subsequently however significant differences do emerge, introverts being significantly inferior. As has been noted these differences are most notable at 9+; at 10+ an interesting trend emerges where in spelling, reading and number high extraverts and ambiverts do not significantly differ,

but are both superior to introverts. The pattern here seems to be for the introverts to emerge as the low achieving group at 10+, and for ambiverts to be inferior to extraverts only at 9+ when differences are most acute. Amongst this group the stable ambiverts are consistently superior. The hypothesis is confirmed, but the implied linearity of the association is not evidenced.

7.26 Attainment and neuroticism : relationships with age

H.14. "The inferiority of neurotic children at 8+ is more marked than that obtaining at 10+."

Data : Tables 6.8 to 6.15,

Statistical appendix 66 to 113

Whilst there was a slight overall tendency for neuroticism to be associated with lower attainment this was not statistically significant at any stage other than in number and numerical reasoning at 9+. The hypothesis cannot be supported and remains unproved. Inspection of the raw scores reveals a complex pattern of changes in scores, but in the absence of significant degrees of change there is no purpose in pursuing these superficial differences.

7.27 Attainment and extraversion : relationships with content

H.15 "The superiority of extravert junior children in spelling, reading and computation (restricted activities) is less marked than that obtaining in comprehension and numerical problem solving (less restricted activities)."

Data : Tables 6.8 to 6.15,

Statistical appendix 66 to 113

Amongst each set of activities only one significant area emerges here at 8+, whilst at 9+ and 10+ all areas yield significant 'F' ratios. In both restricted and unrestricted activities at 8+ extraverts are superior to other groups, in unrestricted activities moderate extraverts do not score significantly more highly than others as they do in 'restricted' work. At 9+ and 10+ more general trends arise, there being significant differences in all areas. In both areas the pattern is for extraverts to be superior to ambiverts, who in turn are superior to introverts. Differences are not significant between extraverts and ambiverts in reading at 9+, nor in spelling at 10+. There is a very slight tendency then for differences to be greater in 'unrestricted' activities, which is in the hypothesised direction. However, as the 'F' table shows, the differences are very slight here and can hardly add to a firm retention of the hypothesis. Present evidence does not offer clear evidence in relation to relationships between extraversion and degrees of restriction in subject areas. It may be that tasks at this level are not so restricted or complex as to produce the degree of inhibition which would result in extraverts being impeded in attainment. For whatever reason, evidence here is too slight to support the hypothesis firmly and it remains unproven.

7.28 Attainment and extraversion : relationships with verbal activities

H.16. "The superiority of extravert junior children in comprehension and verbal reasoning (verbal activities) is more marked than that obtaining in numerical problem solving and spatial reasoning (non-verbal activities)."

Data : Tables 6.8 to 6.15
Statistical appendix 66 to 113

As with the former hypothesis there is some slight evidence here to indicate a relationship in the hypothesised direction, there being no significant differences amongst extraversion groups in spatial reasoning at 9+. However this is tenuous evidence, and elsewhere 'F' ratios and the range of differences seems closely comparable amongst verbal and non-verbal activities. The hypothesis is not supported by the present evidence.

7.29 Attainment and sex differences

H.17. "The attainment mean scores of junior girls are higher than those of junior boys."

Data : Tables 6.8 to 6.15

Statistical appendix 66 to 113

Surprisingly only one significant difference emerges between the attainments of the sexes, and that against the hypothesised trend, boys being superior to girls at 9+ in numerical problem solving. Either the tests here were sex-fair, or the sample was atypical in the distribution of scores between sexes. The general trend is for girls to be superior to boys, as hypothesised, but the absence of marked differences is notable. The norms of the tests employed here did not indicate adjustment between sexes, and the results could simply be a function of the test operating in a rather more general way than is observed in scores from longer and more detailed tests.

Turning to evidence from covariance analyses some interesting additional light is thrown on the problem. In some areas the adjustment of means gives rise to data suggesting some relationships between sex and attainment, girls being superior to boys in number at 10+, boys superior to girls in comprehension and vocabulary at 10+. With means adjusted for differences in spatial reasoning boys are superior to girls

in numerical problems at 9+ and 10+. There appears to be no consistency in these results, the superiority of boys in numerical problems follows that already noted, that of girls to boys in number lends weight to a non-significant difference in absolute scores. It appears that two aspects of a basically similar attainment area are responded to differently by the sexes, and some further study is required to show why this might be so. Perhaps the less restrictive aspects of number work appeal more to the more extravert and stable boys, and vice versa.

The trend for boys to emerge as superior in comprehension and vocabulary at 10+, when adjustments are made for attainment, is more elusive. Over the year the boys moved from being inferior to superior in score in this area, perhaps again a trend associated with approaches which favour their characteristics as more extravert. The trend is another one mildly against the general pattern of findings in this area and merits future investigation, especially in view of the tendency for schooling to appear to generally disfavour boys.

7.210 Attainment, personality and sex : evidence of interaction

H.18. "There is no interaction between sex and personality in relation to attainment amongst junior children."

Data : Tables 6.15

Statistical appendix 66 to 113

Whilst virtually no significant differences emerge in relation to sex differences, and few in relation to neuroticism, nevertheless it may be that some interaction is present between sex, personality and attainment, especially in relation to extraversion, where qualitative differences between sexes in that dimension have been suggested.

Inspection of the tables of means reveals a number of patterns of association, however there is little justification for random selection of trends and only two significant interactions emerge. At 10+ girls show a more linear trend of non-verbal reasoning in relation to extraversion than boys ($p<.05$) and at 8+ the composition and vocabulary trends of sexes differ in relation to neuroticism, boys showing a $\cap$, girls a $\cup$, curve. Amongst boys the overall trend remains linear but amongst girls moderate neurotics are superior. Such isolated trends amongst 40 sets of differences can hardly be considered to indicate a consistent trend, less than 3% of all differences being significant. Perhaps at this age level, whilst sex differences in attainment are commonly identified the interaction of these with personality is of no moment, girls and boys responding similarly. It may be that the results here reflect a 'sex-fair' characteristic of junior school attainment, where 'typing' of particular activities has not begun to be significant and in consequence both sexes and all personality types are able to respond with equal effect. This result requires close comparison with replications amongst older children, but at the present age level the hypothesis is confirmed.

7.211 Covariance of attainment scores amongst extraverts

H.19. "There are no significant differences between the attainment mean scores of extravert and introvert junior children when these means are adjusted for initial differences."

Data : Tables 6.16, 6.17,

Statistical appendix 195-212-237

Employing the previous year's attainment score as a predictor, covariance analyses at 9+ and 10+ reveal interesting patterns in the trend of results. The effect of adjusting means in the covariance analysis is to equate groups in terms of the predictor, and at 9+ no significant differences emerge amongst means of sex or personality groups when so adjusted. This suggests that no sex or personality group is improving in attainment at a significantly higher rate than another, a result which does not support the theory that the mode of junior schooling favours stable extraverts at this stage. It should be noted that at 9+ a number of significant differences do emerge, in relation to extraversion, which are not shown at 8+, indicating a slight but not significant trend for extraverts to gain in attainment at a greater rate than others. However at 10+ the pattern is reversed, with significant 'F' ratios amongst adjusted means of extraversion groups, in respect of number, comprehension, verbal reasoning, numerical problem solving and spatial reasoning. The implications of these results are that at this stage, from age 9+ to 10+, extraverts do gain in attainment at a greater rate than introverts. The superiority is not seen in basic skills of reading and spelling, it may be that at earlier stages in junior school the stress on such skills does not offer the extravert the opportunities for active and social learning which might lie behind the observed effects at 10+. Covariance analysis does not reveal any other significant results, except in complex second order interaction. The hypothesis here can be firmly rejected, the results indicating a consistent and significant trend for extraverts to show superior gains in attainment at 10+, and a slight but insignificant similar trend at 9+.

A further test of the hypothesis was conducted, adjusting

attainment means at 9+ and 10+ in respect of their covariance with non-verbal reasoning. At 9+ and 10+ extraverts are superior in both verbal and non-verbal intelligence scores ($p<.01$), and an adjustment for these differences may indicate more precisely something of attainment effects attributable to personality factors. However the tests employed appear to be closely related to attainments and the effect of adjusting means for intelligence inevitably involves variance arising from both intelligence and attainment when interrelated tests are used, as is the case here. As the non-verbal test showed the lowest relationship with attainment, scores from the test were used as a predictor to minimise such an effect. In the event an interesting pattern of results emerges, in all cases examined, except numerical problem solving at 10+, the trend for extraverts to be superior in attainment remained. This suggests that the observed tendency for extraverts to show greater gains in attainment and to be superior to introverts at 9+ and 10+ is independent of intelligence. Either a constitutional characteristic of extraverts at this age enables them to cope effectively with school work irrespective of intelligence differences, or the work is of such a kind that extravert characteristics are as important in achievement as intelligence factors. Inspection of the range of 'F' ratios indicates that although marked the effect is rather less notable at 10+ than 9+, perhaps again evidence of a diminution of the favourability of extraversion, as suggested earlier.

So in the light of this evidence the hypothesis can be rejected. For whatever reason the extravert groups at 9+ and 10+ are superior both in absolute and in differential attainment scores.

7.212 Covariance of attainment scores amongst neurotics

H.20. "There are no significant differences between the attainment mean scores of neurotic and stable junior children when these means are adjusted for initial differences."

Data : Tables 6.16, 6.17.

Statistical appendix 195- 212 - 237.

In contrast to the results discussed in the foregoing section the analysis of covariance showed no significant differences amongst means of neurotics adjusted for initial differences in attainment. The hypothesis is sustained and results do not indicate that any particular level of neuroticism is associated with faster rates of attainment gain at the junior stage. When means are adjusted in respect of non-verbal intelligence scores differences are significant only in number at 9+ and 10+, stable groups being superior. It may be that this result emerges from anxiety interfering with mathematical attainment, an activity commonly regarded as one provoking concern amongst pupils. With the exception of this one finding the adjustment of means for initial differences in attainment and non-verbal intelligence does not produce evidence of significant interaction and the hypothesis is retained.

7.213 Linearity of regression of attainment on extraversion

H.21. "The relationship between extraversion and attainment is a linear one amongst junior children."

Data : Tables 6.19

Statistical appendix 237 to 242

The means of the high, moderate and low extravert groups were examined for linearity of trend for each attainment and ability test. Inspection shows all trends except one, reading at 8+, to be linear, and this trend is significant in sixteen of the twenty sets of means. The evidence here firmly supports the hypothesis.

7.214 Linearity of regression of attainment on neuroticism

H.22. "The relationship between neuroticism and attainment is a linear one amongst junior children."

Data : Tables 6.19

Statistical appendix 237 - 242

Tests of linearity of trend were made of all neuroticism group means for attainment tests. Inspection shows a much more complex regression pattern here than the consistent linear trend amongst extraverts. Of the twenty sets of means two show positive linear trend, but not significantly; seven show negative linear trend, which is significant in two cases where significant 'F' ratios have already been reported. Of more consistent report is the tendency amongst older children towards curvilinear trend, showing an inverted U in nine cases. Whilst these trends do not reach significance there does appear to be a movement towards a curvilinear regression from 8+ to 10+. It may be that the trend here indicates the emergence of the interference effect where high neurotics are at a disadvantage in complex tasks, whilst low neurotics are insufficiently concerned to respond.

There are significant interactions between neuroticism and extraversion in reading at 9+, and between sex and neuroticism in comprehension at 8+. Whilst these are isolated results, being the only significant first order interactions out of forty involving

neuroticism, they do indicate that in some cases other factors influence the nature of the curvilinear trends described.

The hypothesis can be firmly rejected, although the evidence does not permit the establishment of an alternative hypothesis of curvilinear trend the problem appears to merit further study.

7.215 Personality and attainment amongst junior school children : review of results

A number of points of general interest arise from the detailed discussion above.

Firstly the general consistency of the results is striking, notwithstanding the limitations of the instruments and sample, already discussed, a reasonably coherent pattern of association emerges, a coherence which lends some support to a development of the issues raised.

Across all activities stable ambiverts and neurotic extraverts were the most consistent groups, in terms of major dimensions extraversion is favoured, the relationship being linear. Earlier studies have reported similar trends at this stage (Banks.1964., Lynn.1955., Eysenck and Cookson.1969., Rushton.1969., Savage.1966.), and some evidence from older children follows a similar trend (e.g. Enwistle and Cunningham.1968) although curvilinear trends are reported amongst older pupils. Evidence from Frost (1967) suggesting extraversion to be unrelated is not supported, perhaps differences in instrumentation and emphasis account for the absence in that study of consistent trends found elsewhere. In constrast no neuroticism trends emerge and results support similar findings elsewhere (Eysenck and Cookson.1969., Rushton.1966.). Biggs' (1962) views concerning the inhibitory influence of neuroticism on mathematics is supported by the only two significant

differences - between number and numerical problem means - amongst those considered here. Trends showed no systematic form in relation to neuroticism, and can throw little light on that problem. It may be that the present tasks were in the middle range of difficulty, favouring neither stable nor anxious pupils. Eysenck and White (1964) suggested that test material inhibits neurotics, and the effects of testing the variables must not be lost sight of in reviewing the data here. In the absence of within-school data all discussion focuses on data gathered in circumstances which may disfavour those of greater neuroticism and anxiety, scores of such individuals may in consequence be artificially depressed. Nevertheless the overall results follow Eysenck's own (1969) findings, that extraversion effects are much greater than those of neuroticism.

Some slight evidence discussed here has indicated that there may be a trend for neurotic introverts to improve in attainment after 9+, and clear evidence shows that high attainers increase in neuroticism at this age. Trends here may reflect the effects noted by Biggs (1962) for more intelligent children to control behaviour and to control anxiety and extraversion in such a way as to reduce interference with attainment. Similar effects have been noted with older children (e.g. McCandless. 1956.b.) but Sarason (1960) has observed increasing anxiety at this age to be related to loss of attainment and test taking efficiency. Some speculative discussions of the reasons for the present findings are returned to below, but these must also be seen in the light of the results from covariance analyses.

In the covariance analyses once again trends were general and systematic, indicating the superiority of extraverts in gains in attain-

ment particularly at 9+ and to a lesser degree at the end of the junior school. Many studies have reported complex dynamic interactions of personality and attainment, or have illustrated theoretically their nature (e.g. Butcher et al.1963., Entwistle and Welsh.1969., McCandless. 1956.b., Hebron.1962., Furneaux.1957., Bowyer.1961.) but evidence from longitudinal studies is scant. The important aspect of the present finding is that the effects of Extravert superiority are shown here to be independent of task, or of initial differences, and that such effects are most marked at the later stages of the Junior School.

Results summarised above seem to indicate not simply a trend for extraverts to attain less well with age in comparison to introverts, but rather for extraverts to be increasing in superiority. A trend which must be reversed subsequently to account for findings at later ages. Bayley (1940) suggests that such dynamic theories are appropriate to problems of schooling, and Cattell (1965) notes certain school influences in changes in personality pattern. Suggestion that schools may require different degrees of conditioning, (Brown.1969., Child.1964., Feldsun and Klaushmeir.1962., Finlayson.1970), could account for changes from Junior to Secondary School, but there seems to be no evidence of specific effects in this area.

The pattern is complex, but the trends of results point to differences between stages of schooling, schools and tasks. Lower attainment on the part of extraverts at 8+ could be related to the stress on skills, subsequent superiority to more open, less structured activities, a later reversal to introvert superiority is associated with a more formal secondary regime. Child (1964) supports such a view, and Entwistle (1968) considers academic motivation to be related to the character of schooling. Many reports suggest that junior school

practices of themselves favour the extravert at certain stages (e.g. Grimes and Allinsmith.1961., Kemp.1957., Lynn.1955., Levy et al.1967., Leith and Bassett.1967., Soloman.1961., Sontag.1958., Finlayson.1970., Entwistle and Welsh.1969.). It appears reasonable to follow Rushton's (1969) suggestion that the contrast in "school climate" between Junior and Secondary stages will be related to the results of personality and attainment studies. It is also useful to speculate on the effects such changes will have on pupils.

Evidence to date is probably confounded by the changes in pupil personality, changes effected in part by the school experiences themselves. Thus successful children learn to be anxious about school, an effect noted in this study, it may be that they also learn to respond in an extraverted way in Primary classrooms. It would be interesting to follow up trends of extraversion scores to check whether successful pupils learn to become introverted subsequently, or at least less 'masculine' in extraversion, adopting more acceptable behaviour patterns as Sontag (1955) suggests. Again it would seem important to examine how far it is possible to fit methods to pupils, or whether it is possible to adopt non-doctrinaire classroom approaches which admit a wider range of responses than is sometimes found.

Problems for the classroom include the examination of methods in relation to personality, and the avoidance of techniques uncongenial to given individuals, in personality terms. For research, problems of measurement and definitions are again indicated, (not least the possibility that high attainers merely learn to report different behaviour at different stages). It is an urgent task to identify how far previous research in this area reflects particular biases in schools in favour of certain forms of response and involvement, rather

than constitutional differences in attainment between pupils' personality types, or interactions with tasks and content. Interactions with sex were not found in the present sample, but it is not suggested that effects of sex differences should be omitted from the studies suggested here. The theoretical problems of analysing the complex interactions implied here remain to be examined, they might focus on describing fully the apparent tendency for extraverts to increase in superiority from 7+ to 10+, and then decline from 11+ to 13+.

Chapter 7.

Discussion of results.

7.3 Personality and attitudes amongst junior school children : results and hypotheses

Six hypotheses were examined in relation to personality and attitudes amongst junior school children, each is discussed below.

7.31 Attitudes towards the curriculum : sex differences

H.23. "Girls hold more favourable attitudes towards the curriculum than boys."

Data : Tables 6.20 - 6.24

Statistical appendix 114 - 138

Only four of fifteen differences examined were significant, but these were all in the hypothesised direction. It is notable that there are no significant differences at 10+. These results do not follow the commonly reported trend for girls to hold more favourable attitudes towards the curriculum than boys, this parallels the absence of sex differences in attainment and may be a function of an atypical sample in which boys, being more successful in relation to girls than commonly observed, are more favourably inclined towards the curriculum than is usually the case. The hypothesis may be tentatively retained in relation to the 8+ results, but not for subsequent age levels.

7.32 Attitudes towards school : sex differences

H.24. "Girls hold more favourable attitudes towards school than boys."

Data : Tables 6.28 - 6.37

Statistical appendix 139 - 194

The results very substantially support the hypothesis, girls showing significantly higher mean scores than boys in all cases for the first seven areas of attitudes examined. There are no differences between sexes in respect of anxiety about school work, and differences in self image are not so marked. In social adjustment at 10+ boys are superior to girls. Clearly in terms of attitudes to school and class work, and in relationships with the teacher, the hypothesis is supported. In less specific areas girls do not show the same degree of superiority. The hypothesis can be retained.

7.33 Attitudes towards curriculum, related to extraversion

H.25. "Extraversion is not related to attitudes towards the curriculum."

Data : Tables 6.20 - 6.24

Statistical appendix 114-138

No significant 'F' ratios emerged amongst the attitude means of the extraversion groups. Three significant interactions of sex and extraversion at 8+ indicate that attitudes are highest amongst introvert girls, lowest amongst introvert boys. The hypothesis is retained, whilst introversion may be related to favourable attitudes amongst girls the evidence is too slight to permit alternative hypotheses to the one given.

7.34 Attitudes towards curriculum, related to neuroticism

H.26. "Neuroticism is not related to attitudes towards the curriculum."

Data : Tables 6.20- 6.24

Statistical appendix 114 - 138

No significant 'F' ratios emerged amongst the attitude means of the neuroticism groups. The hypothesis is retained.

7.35 Attitudes towards school, related to extraversion

H.27. "Extraversion is not related to attitudes towards school."

Data : Tables 6.28 - 6.37

Statistical appendix 139-194

Some scattered results here, in just over 5% of the sets of means, suggest a slight relationship between extraversion and certain attitudes. Introversion is associated with a favourable other image, conforming, a good relationship with the teacher, good social adjustment and favourable self image. An interesting result in relation to anxiety about school work shows introverts to be more anxious at 9+, extraverts at 10+. If this latter result is related to those concerned with attainment it could be suggested that the greater rate of achievement noted from 9+ to 10+ is associated with the change in concern evidenced here.

Whilst there are few significant results here they stand well together and suggest that a slight tendency for introverts to have better attitudes towards the "social relationships" aspects of schooling. The hypothesis is rejected, although the evidence for this is not especially strong and further studies are indicated.

7.36 Attitudes towards school, related to neuroticism

H.28. "Neuroticism is not related to attitudes towards school."

Data : Tables 6.28 - 6.37

Statistical appendix 139 - 194

Results here are more scattered and less consistent than those reviewed in the previous section. Stable children appear to be less well socially adjusted, to hold lower academic self images at 9+ and

and 10+ respectively, and to show greater concern for school work at 10+. This last result follows the expected trend, associating neuroticism and anxiety. Many of the items in the scale employed are similar to those included in 'achievement motivation' scales (e.g. Entwistle.1968) and results follow a logical pattern associating this with high concern. It is interesting that this effect only emerges at 10+, supporting the general evidence that at about this stage concern for school work on the part of the pupil begins to be a significant factor. Other results in this area do not have the coherence which led to the previous hypothesis being rejected, in the present case the null hypothesis is generally retained.

7.37 Personality and attitudes amongst junior school children : review of results

Most notable amongst these results is the conspicuous absence of any sustained systematic effects. In only one area, the association of neuroticism and anxiety concerning school, does a meaningful relationship with personality variables emerge.

It may be that the instrumentation here is less reliable than attainment tests and that findings are swamped by error, although previous evidence suggests that the tests are sensitive ones. The other possibility is simply that pupils adjust affectively towards school in a way much less dependent on personality than is possible in attainment. Differences between schools reported in chapter 5 were much more marked than those observed between personality groups here. Whilst particular schools may create climates evoking particular response, as seems the case (Barker-Lunn.1969., Sharples.1969., Fitt. 1956.) there appear to be no general trends of association between

attitudes and personality. This finding fits well with that of Regan (1967) amongst older pupils. Research may clarify the nature and origins of attitudes towards school, perhaps associating these with personality factors in within-school studies. Problems for the classroom centre more on the consistent finding of better attitudes amongst girls, perhaps action projects could explore situations more congenial to boys. The absence of specific associations here is probably related to the absence of specific attempts by the schools to influence affective dimensions (in contrast to their stress on attainment), it would be instructive to study the function of personality if such conscious attempts were to be made.

Chapter 7.

Discussion of results.

7.4 Personality, attainment and differences between schools

One hypothesis was examined in relation to personality and attainment within schools, this is reviewed below.

7.41 Attainment and extraversion : differences between schools

H.29. "Relationships between personality and attainment do not differ as between schools."

Data : Tables 6.18

Statistical appendix 243

The hypothesis was examined only in relation to extraversion in three schools, as this was the only dimension to exhibit consistent relationships with attainment and two schools were too small to permit statistical analysis. Marked differences emerge between the three schools examined: in School A only one chi-square was significant, showing extraversion to be related to high attainment in numerical problem solving at 10+. In School D four chi-square values are significant, associating extraversion with high attainment in number at 8+, comprehension at 9+, and comprehension and verbal reasoning at 10+. In School E extraversion is related to successful attainment in spelling, number, verbal reasoning and numerical problem solving at 8+, in all but number at 9+, and in all but number and comprehension at 10+. Reference back to the descriptions of schools in chapter 5 facilitates a comparison of these results with the general characteristics of the schools, it appears that the extraverts are most closely associated with success in the school where low attainments tended to improve during junior schooling, whilst the association is least strong in the school

where attainments are higher. Again it will be noted that the more 'formal', skill oriented school has a closer association between extraversion and success than less 'formal' schools.

These trends are intriguing, and suggest that the results reviewed in section 7.2 here may be specific to particular schools. It seems reasonable to hypothesise that processes inside the schools determine the extent to which personality factors rise in significance as variables affecting attainment. Moreover these indications of differences between schools support the line of interpretation of results which associates personality v attainment interaction as a function of schooling experiences and modes of teaching, rather than interpretations which stress general constitutional relationships between extraversion and achievement.

The problem of examining classroom and school differences is severe, due to the small numbers involved and the limited scope of instruments for defining classroom characteristics. Nevertheless the present results do indicate that a more extensive analysis within classes is required to throw some light on the findings, as suggested in 7.215 above. Results here raise doubts as to the generality of findings in this area, indicating that between-schooldifferences may be an unsuspected source of variance in some previous studies. The suggestion that the association differs between different teaching styles follows opinions of Banks (1964) and Biggs (1962) that modes of learning are of importance, and supports the suggestion of Trown (1969) and others that modes of schooling might be devised in terms of their compatibility with the personalities of pupils.

Chapter 8.

Conclusions.

The study described above considered several direct hypotheses concerning the personality, attitudes and attainment of Junior School children. These hypotheses are reviewed briefly below in the form of conclusions derived from the present study.

8.1 Summary of conclusions

8.11 Trends of extraversion

Extraversion scores on the J.E.P.I. increase with age amongst Junior School children.

8.12 Trends of neuroticism

Neuroticism scores on the J.E.P.I. increase from 8+ to 10+, but show some levelling at 9+.

8.13 Neuroticism and sex differences

There are no significant differences between sexes in respect of neuroticism at this stage.

8.14 Extraversion and sex differences

Boys are higher in extraversion at this stage, but differences diminish with age.

8.15 Stability of extraversion classifications

Groups classified as of high, average or low at 8+ change in mean score subsequently, regressing towards the mean. Individual extraversion scores account for only 28% of the variance after an interval of one year.

8.16 Stability of neuroticism classifications

Groups classified as of high, average or low at 8+ change in mean score subsequently, regressing towards the mean. Individual

neuroticism scores account for only 27% of the variance after an interval of one year.

8.17 Changes in extraversion in relation to attainment

Extraverted children of high attainment do not tend to become more introverted during the Junior School period.

8.18 Changes in neuroticism in relation to attainment

Stable children of high attainment tend to become more neurotic during the Junior School period.

8.19 Attainment and extraversion

Extravert junior school pupils are higher in attainment than introverts.

8.110 Attainment and neuroticism

Stable junior school pupils are no higher in attainment than neurotics.

8.111 Attainment and extraversion : relationships with age

Extravert junior children show greatest superiority in attainment from 9+ to 10+.

8.112 Attainment and stability : relationships with age

Stable junior children do not differ in attainment from others at any age level.

8.113 Attainment and introversion : relationships with age

Introvert junior children are less inferior in attainment at 10+ than at 8+.

8.114 Attainment and neuroticism : relationships with age

Neurotic junior children do not differ in attainment from others at any age level.

8.115 Attainment and extraversion : relationships with structure of content

No clear relationships are evidenced between the structure of particular school attainment areas and the superiority of extraverts.

8.116 Attainment and extraversion : relationship with verbal activities

Extravert junior children are no more superior in verbal than in non-verbal activities.

8.117 Attainment and sex differences

In respect of test scores on the materials employed in this study girls do not show a superiority to boys.

8.118 Attainment, personality and sex : evidence of interaction

There are no consistent patterns of interaction between attainment, personality and sex at this stage.

8.119 Covariance of attainment scores amongst extraverts

Extraverts are more successful at older age levels in the junior school, when means are adjusted for initial differences in attainment and non-verbal reasoning.

8.120 Covariance of attainment scores amongst neurotics

Neurotics do not differ in attainment from other groups, when means are adjusted for initial differences in attainment and non-verbal reasoning.

8.121 Linearity of regression of attainment on extraversion

There is a consistent positive linear relationship between attainment and extraversion at this stage.

8.122 Linearity of regression of attainment on neuroticism

No systematic trends of association, linear or curvilinear are evidenced between attainment and neuroticism at this stage.

8.123 Attitudes towards the curriculum : sex differences

At 8+ girls hold more favourable views of the curriculum, this trend is not noted at 9+ and 10+ in the present sample.

8.124 Attitudes towards school : sex differences

Girls hold more favourable attitudes towards school at this stage.

8.125 Attitudes towards the curriculum, related to extraversion

Extraverts do not differ from others in attitudes towards the curriculum.

8.126 Attitudes towards curriculum, related to neuroticism

Neuroticis do not differ from others in attitudes towards the curriculum.

8.127 Attitudes towards school, related to extraversion

Introverts hold slightly more favourable views of school in some areas than other groups.

8.128 Attitudes towards school, related to neuroticism

There are no relationships between neuroticism and attitudes towards school, except that they tend to be more anxious concerning school work.

8.129 Attainment and extraversion : differences between schools

Schools differ in respect of the degree of association between extraversion and attainment evidenced amongst their pupils.

Chapter 8.

Conclusions.

8.2 Limitations of the conclusions

The study reported here is one of small scale, and was conducted within limited resources, it is probable that the results must be viewed with caution in respect of certain features of the design and research procedure, and these are reviewed briefly below.

8.21 Sample

Results here are based on limited numbers of children of rather low attainment, parallel studies with more representative samples are required. Sex differences in the study sample appear to be atypical.

8.22 Personality measures

Evidence of the personality tests used here suggest that scores are somewhat unstable, replication studies are required with more reliable personality measures.

8.23 Attainment measures

Attainment measures were relatively crude and it was not possible to use reliable within-school assessments. Future studies might be based on attainment data of greater precision within schools, and also of wider coverage of the curriculum.

8.24 School conditions

Whilst the findings of the study suggest that differences between schools are related to differential patterns of association between attainment and personality, the descriptions of schools given here do not permit detailed analysis of this problem. A more complex analysis of these effects is required.

8.25 Analysis

The approximate methods of analyses employed, whilst adequate for the general trends examined here, must be interpreted with caution, and call for supportive evidence from replicative studies. As it is virtually impossible within normal school conditions to achieve matched sample groups, regression analyses would probably offer an appropriate alternative treatment of similar data from groups of schools displaying similar characteristics.

Chapter 8.

Conclusions.

8.3 Implications of the conclusions for future research

The study reported here gives rise to findings which have a number of implications for future research, these are reviewed briefly below.

8.31 Follow up

Results here indicate interaction at three age levels, complimentary studies up to age 8+ and from age 10+ are still required. Such studies might take account of the limitations revealed here and throw further light on the trends of results identified.

8.32 Design of studies

Results here indicate that general trends may be of less practical significance than smaller scale evidences of particular effects and association. A balance is required between detailed studies of specific effects, and further large sample surveys. Within-school studies including individual assessment are indicated.

8.33 Covariance effects

The results of covariance analyses here suggest patterns of interaction somewhat different from those indicated by cross-sectional evidence. Future studies might focus on longitudinal designs in order to explore these effects more fully.

8.34 Affective learning

Whilst no interaction was revealed between personality and attitudes to school, two findings do have implications for teaching in this area. Firstly that covert influences in schools appear to be associated with unplanned but systematic changes in pupils' per-

sonality, secondly that girls, irrespective of personality variables, appear to hold favourable attitudes towards school. These findings merit further examination.

8.35 Cognitive learning

Some evidence here supports the view that some personality patterns are better suited to particular school experiences than others. Studies of classroom effects in this context are urgently required. The role of extraversion in successful attainment in Junior School deserves special attention. Many attainment areas appeared to be more commonly associated with success amongst girls, areas in which boys are successful here may be appropriate ones in which to identify the nature of effects of sex on cognitive learning at this stage.

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Appendices.

Appendix

Specimen of Personality Test
J.E.P.I. Items 1-29.

E ○ N ○ L ○ | | | | | | | | | | |

REMEMBER TO ANSWER EACH QUESTION

		YES	NO
1.	Do you like plenty of excitement going on around you?	○	○
2.	Do you often need kind friends to cheer you up?	○	○
3.	Do you nearly always have a quick answer when people talk to you?	○	○
4.	Do you sometimes get cross?	○	○
5.	Are you moody?	○	○
6.	Would you rather be alone instead of meeting other children?	○	○
7.	Do ideas run through your head so that you cannot sleep?	○	○
8.	Do you always do as you are told at once?	○	○
9.	Do you like practical jokes?	○	○
10.	Do you ever feel "just miserable" for no good reason?	○	○
11.	Are you rather lively?	○	○
12.	Have you ever broken any rules at school?	○	○
13.	Do lots of things annoy you?	○	○
14.	Do you like doing things where you have to act quickly?	○	○
15.	Do you worry about awful things that might happen?	○	○
16.	Can you always keep every secret?	○	○
17.	Can you get a party going?	○	○
18.	Do you get thumping in your heart?	○	○
19.	When you make new friends do you usually make the first move?	○	○
20.	Have you ever told a lie?	○	○
21.	Are you easily hurt when people find fault with you or the work you do?	○	○
22.	Do you like telling jokes or funny stories to your friends?	○	○
23.	Do you often feel tired for no good reason?	○	○
24.	Do you always finish your homework before you play?	○	○
25.	Are you usually happy and cheerful?	○	○
26.	Are you touchy about some things?	○	○
27.	Do you like mixing with other children?	○	○
28.	Do you say your prayers every night?	○	○
29.	Do you have "dizzy turns"?	○	○

Appendix

Specimen of Personality Test
J.E.P.I. Items 30–60

		YES	NO
30.	Do you like playing pranks on others?	○	○
31.	Do you often feel fed-up?	○	○
32.	Do you sometimes boast a little?	○	○
33.	Are you mostly quiet when you are with others?	○	○
34.	Do you sometimes get so restless that you cannot sit in a chair long?	○	○
35.	Do you often make up your mind to do things suddenly?	○	○
36.	Are you always quiet in class, even when the teacher is out of the room?	○	○
37.	Do you have many frightening dreams?	○	○
38.	Can you usually let yourself go and enjoy yourself at a gay party?	○	○
39.	Are your feelings rather easily hurt?	○	○
40.	Have you ever said anything bad or nasty about anyone?	○	○
41.	Would you call yourself happy-go-lucky?	○	○
42.	Do you worry for a long while if you feel you have made a fool of yourself?	○	○
43.	Do you often like a rough and tumble game?	○	○
44.	Do you always eat everything you are given at meals?	○	○
45.	Do you find it very hard to take no for an answer?	○	○
46.	Do you like going out a lot?	○	○
47.	Do you sometimes feel life is just not worth living?	○	○
48.	Have you ever been cheeky to your parents?	○	○
49.	Do other people think of you as being very lively?	○	○
50.	Does your mind often wander off when you are doing a job?	○	○
51.	Would you rather sit and watch than play at parties?	○	○
52.	Do you find it hard to get to sleep at nights because you are worrying about things?	○	○
53.	Do you usually feel fairly sure you can do the things you have to?	○	○
54.	Do you often feel lonely?	○	○
55.	Are you shy of speaking first when you meet new people?	○	○
56.	Do you often make up your mind when it is too late?	○	○
57.	When children shout at you, do you shout back?	○	○
58.	Do you sometimes feel specially cheerful and at other times sad without any good reason?	○	○
59.	Do you find it hard to really enjoy yourself at a lively party?	○	○
60.	Do you often get into trouble because you do things without thinking first?	○	○

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED *ALL* THE QUESTIONS

Trains are much better now than they were a hundred years ago. If we travel any long distance today it is in a train with a corridor and we can have meals in a restaurant car. If travelling overnight it is possible to have a comfortable berth in a sleeping car.

18. What part of the train mentioned in the passage is used for eating in?

.....

19. What allows you to move along inside the train? .....

20. Which ONE of the following would you usually expect to find in a restaurant car?

.....

driver waiter guard porter soldier

21. Which meal would you need after a journey in a sleeping car?

.....

Meanwhile darkness fell and, while the others retired for the night, my three sons and I kept watch for any further signals. A great storm of wind and rain arose with distant lightning and we were almost deafened by the angry roar of the sea. For two days and two nights the tempest raged, and it was very late on the Thursday before we were able to go out.

22. How many people kept watch?.....

23. What was the loudest sound they heard? .....

24. On which day of the week did the storm start?.....

25. Which ONE word in the passage tells us that *girls* did not share the watch?

.....

26. Which ONE word in the passage also means storm? .....

TURN OVER

Page 8

VOCABULARY

What does each WORD mean?

For each question below, choose the best of the five meanings and write A, B, C, D or E on the line.

1. RAINBOW .....

A. A coloured arch in the sky.
B. A kind of fish.
C. Many colours mixed together.
D. A reward for winning.
E. A kind of cloud.

2. CURTAIN .....

A. Something made of cloth.
B. A kind of window.
C. It holds two pieces of cloth together.
D. Cloth used to cover a window.
E. Movable things inside a house.

3. ANKLE.....

A. A kick with the foot.
B. A kind of stocking.
C. A bone between the foot and the leg.
D. A part of the body.
E. Something to sit on.

4. PRIZE.....

A. An expensive book.
B. A gift made once a year.
C. To say that something is good.
D. A cup made of silver.
E. A reward for winning.

5. SLAP .....

A. To dive into water.
B. To smack with the hand.
C. To sound like a crash.
D. To punish somebody.
E. To kick with the foot.

6. SERVANT .....

A. Someone who works in a shop.
B. Someone who sweeps the floor.
C. Someone who makes clothes.
D. Someone who works indoors.
E. Someone who works for another.

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VERBAL REASONING

In each question the missing word is one of the five words below.
DRAW A LINE under this word.

1. Mary ——— Fred Ann John
   girl dad dog Joan baby

2. car bus train ——— lorry
   van hill road boat driver

3. dog cat ——— mouse rabbit
   bee rat house girl hutch

4. ——— blue black pink red
   ink sky yellow flower soot

5. oak elm ——— fir walnut
   pine berry leaf tree branch

6. seven ——— nine ten eleven
   six twelve five seventh eight

7. dot pin ——— stitch fluff
   rock house knit tree crumb

8. cellar hall ——— attic roof
   bedroom chimney hut garage floor

9. leaf branch ——— wood forest
   tree flower moss twig bud

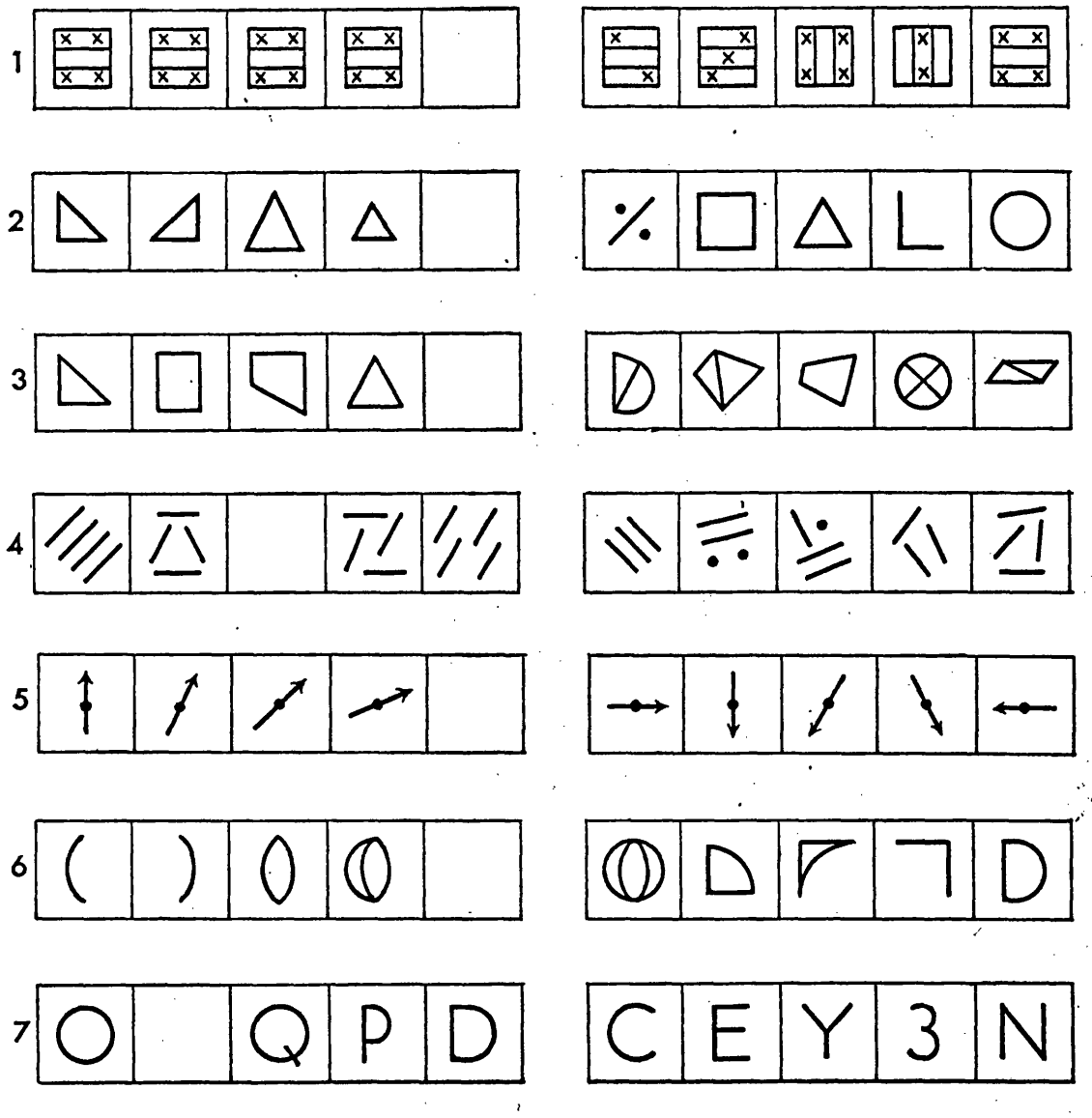
V

Page 12

PUZZLES

In each question below there is an empty box . . .

. . . The missing shape is in one of the five boxes on this side.
DRAW A LINE under this shape.



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SPELLING

Your teacher will read these sentences for you.

Write your answers on the line.

1. My father is a big .....(MAN)..... .
2. Fred lost his .....(CAP)..... on the way to school.
3. Mrs. Brown .....(PUT)..... the cat outside the door.
4. The man .....(LOST)..... his way in the fog.
5. The .....(MOUSE)..... was chased by the cat.
6. The man described his stolen car to the .....(POLICE)..... .
7. Jack jumped over the stream in one .....(BOUND)..... .
8. When the lights failed we lit the .....(CANDLES)..... .
9. The .....(PORTRAIT)..... on the wall is by a famous artist.
10. We sat down to eat .....(ROAST)..... beef and mashed potatoes.
11. He jumped with .....(DELIGHT)..... when he heard the news.
12. There was a .....(KNOT)..... at each end of the rope.

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READING

You will be asked to read these words to your teacher.

Read down this column first.

1.	sing	**13.**	celebration	**25.**	melodious
2.	bell	**14.**	throughout	**26.**	masculine
3.	when	**15.**	artistic	**27.**	malignant
4.	much	**16.**	radiation	**28.**	retaliate
5.	aunt	**17.**	sealed	**29.**	aquarium
6.	liver	**18.**	enraged	**30.**	pnuemonia
7.	cock	**19.**	bullet	**31.**	proprietor
8.	ambulance	**20.**	gaunt	**32.**	cubicle
9.	slight	**21.**	relish	**33.**	vicious
10.	cellar	**22.**	literature	**34.**	citation
11.	boulder	**23.**	pedantic	**35.**	delirium
12.	dining	**24.**	liberalise	**36.**	criticism

DO NOT GO ON

MIXTURES (+ − × ÷)

Draw your own line for the answer when needed.

	(a)	(b)	(c)	(d)	(e)
1.	11 + 22 =	2)8	34 × 2 =	21 + 71 =	12 + 15 =
2.	37 + 91 =	11 + 80 =	63 + 14 =	1)49	43 + 26 =
3.	60 + 76 =	45 − 12 =	3)66	77 − 23 =	22 − 17 =
4.	18 − 9 =	38 × 3 =	25 × 9 =	6)42	2)56
5.	95 × 6 =	5)85	142 + 38 =	283 − 28 =	184 × 6 =
6.	313 − 131 =	222 + 888 =	8)152	296 × 7 =	44 × 10 =

DO NOT TURN OVER

Page 26

12. In a cricket match Tom scored 47 runs and Harry scored 35 runs. The other 9 players in the team between them scored another 36 altogether. How many runs did the team score?

runs

13. There were 1 lb. 12 oz. of biscuits left in the tin. Jane packed them into 4-oz. packets to sell. How many packets did she make?

packets

14. Mother bought 5 oranges and each weighed 7 oz. How much did they weigh altogether in lb. oz.?

lb. oz.

15. The number of people living in one village was 2,742. In the next village, there were 3,127 people. How many more people lived in the second village?

people

16. A joint of beef weighed 9 lb. 12 oz. Mother bought half the joint. What weight did she buy?

lb. oz.

X

Appendix

Specimen of attitude test
Attitude to curriculum : entire test

Name.....

How do you feel?

Some children were talking about the things which they did in school.
Here are some of the things they said.
Read carefully what they said and see if you feel the same.
You might like some things a lot, others you might not like at all.
Different children like different things.

Each thing the children said has a number by it.

1. I hate it.

2. It is the worst thing we do in school.

3. I can't stand it.

4. It is alright sometimes.

5. I think it is good.

6. It is most enjoyable.

7. It is good fun and I like it very much.

8. I love it.

Now, write down the number of the sentence which says how you feel about these things you do in school. Write the number in the box after the name of the thing you do in school.

READING ☐

MATHEMATICS ☐

WRITING STORIES ☐

ART AND CRAFT ☐

P.E. ☐

Appendix

Socio - Cultural Index.

Item.	Validity.
Going to my music (or dancing, or elocution) lesson.	.40
How to fill in the pools.	.38
A good book.	.54
Out in the dark with my friends.	.36
Hobbies with mum and dad.	.11
An evening in the chip shop.	.39
Going to a concert.	.47
Television after nine o'clock.	.58
An interesting visit.	.60
Comics.	.30
An outing with mum and dad.	.49
Playing tricks on the neighbours.	.71
My birthday party.	.60
Out with the gang.	.63
Preparing a meal.	.12
Breaking windows.	.39
My playroom.	.15
Baby sitting.	.37

Appendix.

Attitudes towards school. 10 scales

1. Attitude to school items (high score = favourable attitude)

School is fun (+)
School is boring (-)
I like school (+)
I bet going out to work is better than school (-)
I would leave school tomorrow if I could (-)
Going to school is a waste of time (-)

2. Interest in school work (high score = interested in school work)

We spend too much time doing arithmetic (-)
I like doing hard sums (+)
At school they make you do things you don't want to do (-)
We have interesting lessons in school (+)
I enjoy most school work (+)
School lessons are boring (-)
I enjoy most school work (+)

3. Importance of doing well (high score = 'doing well' considered important)

I should like to be one of the cleverest pupils in the class (+)
I work and try very hard in school (+)
I should like to be very good at school work (+)
Doing well at school is most important to me (+)
I should like to be better at games than at school work (-)

4. Attitude to class (high score = favourable attitude to class)

I like being in my class (+)
I'd prefer to be in another class (-)
I hate being in the class I'm in now (-)
I'm happy to be in the class I'm in now (+)
I think a lot of children of my age would like to be in my class (+)
My class is nicest of all (+)
I'd rather be in my class than the others for my age (+)
I shall be sorry to leave my class (+)

5. 'Other' image of class (high score = good 'other' image)

Other children think we're very clever in my class (+)
Other children make fun of my class (-)
Otherclasses think they're better than us (-)
When people ask me what class I'm in I always feel happy to tell them (+)
My class gets blamed for things we don't do (-)
Other classes think we're nice in my class (+)

6. Conforming versus non-conforming pupils (high score = conforming)

When the teacher goes out of the room I play about (-)
I dislike children who are noisy in class (+)
It's nice to fool about in class (-)
I like children who get into trouble (-)
I like people who get me into mischief (-)
I like children who get into trouble (-)

7. Relationship with teacher (high score = good relationship)

Teacher is interested in me (+)
Teacher gets on well with me (+)
Teacher thinks I'm a trouble maker (-)
I think my teacher likes me (+)
My teacher is nice to me (+)
Teacher is always nagging me (-)
Teacher gets on well with me (+)
Teacher thinks I'm a trouble maker (-)

8. Anxiety in the classroom situation (high score = not anxious)

Children who can't do their school work feel ashamed (-)
I would bother me if I got my work wrong (-)
School work worries me (-)
I should feel a little afraid if I got my spellings or sums wrong (-)
I enjoy being asked questions by my teacher (+)
I should feel a little afraid if I got my spellings or sums wrong (-)
I feel scared when teacher asks me questions about my work (-)
School work worries me (-)
I'm scared to ask my teacher for help when I don't understand (-)

9. Social adjustment/Getting on well with classmates (high score = good relationship)

I don't always get on well with some of the children in my class (-)
I think the other children in my class like me (+)
I have no one to play with at playtime (-)
I have no friends that I like very much in my class (-)
I have no one to play with at playtime (-)

10. Academic self-image (high score = good self image)

I get a lot of sums wrong (-)
I think I'm pretty good at school work (+)
I'm useless at school work (-)
My teacher thinks I'm clever (+)
I'm very good at sums (+)
When we have tests I get very good marks (+)
I find a lot of school work difficult to understand (-)
I sometimes think I'm no good at anything (-)
I don't seem to be able to do anything really well in school (-)

Statistical Appendix

to

A longitudinal study of the personality and the attainments and attitudes of Junior School Children.

submitted by

Derek Sharples

for the degree of

Ph. D.

of the

University of Bath

1971

Statistical Appendix.

This appendix is designed to be read alongside the text of the thesis, tables are arranged as far as possible in the sequence in which the data are summarised and discussed in the text.

Table numbers only are employed, numbers on page edges corresponding to the table(s) included on that page.

Summary contents only are given overleaf, the main groups of tables being listed there; more detailed references to the tables are made in the text.

Statistical techniques summarised in the tables of this appendix are described in the text and are indicated in the bibliography of the main volume.

For clarity of presentation of the tables the pages are presented uniformly with the book turned through 90 degrees. To facilitate reference to the contents these are presented with the same orientation.

TABLE OF CONTENTS.

(Note: abbreviations as given in the text are employed throughout the tables.)

Test	Means 8+	Means 9+	Means 10+	Analyses of Variance 8+	Analyses of Variance 9+	Analyses of Variance 10+	Duncan's Multiple 't' tests. 8+	Duncan's Multiple 't' tests. 9+	Duncan's Multiple 't' tests. 10+
Attitudes to Composition		114		115	116	117	-	-	-
Reading		118		119	121	122	120	-	-
Maths.		123		124	125	126	-	-	-
P.E.		127		128	130	131	129	-	132
Art		133		134	137	138	135-136	-	-

	Means 8+	Means 9+	Means 10+	Analyses of Variance 8+	Analyses of Variance 9+	Analyses of Variance 10+	Duncan's Multiple 't' tests. 8+	Duncan's Multiple 't' tests. 9+	Duncan's Multiple 't' tests. 10+
Attitudesto school		139		140	141	142	-	-	-
Interest in school		143		144	145	146	-	-	-
Importance of doing well		147		148	149	150	-	-	-
Attitude to class		151		152	154	155	153	-	-
'Other' image of class		156		157	158	160	-	159	-
Conforming v Nonconforming		161		162	164	166	163	165	167
Relationship with teacher		168		169	171	172	170	-	-
Anxiety in school work		173		174	175	177	-	176	178-179
Social adjustment		180		181	183	186	182	184-185	-
Self image		187		188	189	192	-	190-191	193-194

		Covariance with attainment		Duncan's 't' test		Covariance with Spatial R.		Duncan's 't' test.	
		9+	10+	9+	10+	9+	10+	9+	10+
Attainments	Spelling	195	196	-	-	213	215	214	216
	Reading	197	198	-	-	217	220	218-219	221-222
	Number	199	200	-	201	223	226	224-225	227-228
	Comp/Vocab	202	203	-	204	229	232	230-231	233-234
	Verbal R.	205	206	-	207	-	-	-	-
	Numerical Prob.	208	209	-	210	235	237	236	-
	Spatial R.	-	211	-	212	-	-	-	-

Linearity of regression with personality.

	with extraversion			with neuroticism		
	8+	9+	10+	8+	9+	10+
Attainments	237	238	239	240	241	242

Means and Standard Deviations of Classes: Personality. Age 8+

Source	n	Extraversion $\bar{x}$	Extraversion SD	Neuroticism $\bar{x}$	Neuroticism SD
Class A_1	29	16.17	3.09	13.79	5.19
A_2	31	16.90	3.61	13.39	5.35
B	11	16.91	1.51	14.91	5.72
C	6	17.67	1.21	15.33	2.80
D	37	16.65	3.77	14.41	3.98
E_1	31	15.13	4.33	13.10	3.64
E_2	31	16.13	3.72	10.35	4.21
E_3	29	14.62	4.06	11.90	4.41
E_4	29	15.76	3.50	11.69	4.86
Total	234	15.42	3.87	11.76	4.35

Means and Standard Deviations of Classes: Personality. Age 9+

Source	n	Extraversion $\bar{X}$	Extraversion SD	Neuroticism $\bar{x}$	Neuroticism SD
Class A_1	29	17.59	2.75	12.28	5.12
A_2	31	16.61	3.27	13.10	4.59
B	11	18.45	2.50	13.75	5.24
C	6	18.34	2.07	13.00	4.10
D	37	17.19	3.54	15.08	5.06
E_1	31	15.58	4.11	13.90	5.52
E_2	31	16.55	3.86	11.81	4.48
E_3	29	15.72	4.27	11.76	5.32
E_4	29	15.41	2.83	12.79	5.42
Total	234	16.55	3.56	13.07	5.10

Means and Standard Deviations of Classes: Personality. Age 10+

Source	n	Extraversion $\bar{x}$	Extraversion SD	Neuroticism $\bar{x}$	Neuroticism SD
Class A_1	29	17.10	3.42	12.79	5.08
A_2	31	17.65	3.05	14.52	4.99
B	11	18.27	3.26	14.18	3.71
C	6	16.83	5.78	14.17	2.71
D	37	17.30	4.10	16.05	3.99
E_1	31	16.16	4.29	11.65	5.15
E_2	31	18.26	3.62	11.81	4.14
E_3	29	16.97	3.42	10.31	5.69
E_4	29	18.38	4.10	12.66	4.91
Total	234	17.42	3.73	13.03	5.02

Table 4 — Analysis of Variance Summaries — Personality tests. — Age 8+

Test	Source	SS	df.	MS	F	Sig.
J.E.P.I. Neuroticism	Between classes	467.9068	8	58.4884	2.8108	1%
	Within classes	4681.9778	225	20.8088		
	Total	5149.8846	233			
J.E.P.I. Extraversion	Between classes	148.1625	8	18.5203	1.4151	None
	Within classes	2944.6281	225	13.0872		
	Total	3092.7906	233			

Table 5

Significance of differences between means :

Personality Tests. Neuroticism . Age 8+.

Means	A : C	B : B	C : D	D : A_1	E : A_2	F : E_1	G : E_3	H : E_4	I : E_2	Shortest Significant Ranges	5%	1%
A 15.33		.42	.93	1.54	1.95	2.24	3.44	3.64	4.98	R_9	3.5966	4.8809
B 14.91			.50	1.12	1.52	1.81	3.01	3.22	4.55	R_8	3.5733	4.8438
C 14.41				.61	1.02	1.31	2.51	2.72	4.05	R_7	3.5436	4.8004
D 13.79					.41	.70	1.90	2.10	3.44	R_6	3.5055	4.7464
E 13.39						.29	1.49	1.70	3.03	R_5	3.4558	4.6786
F 13.09							1.20	1.41	2.74	R_4	3.3870	4.5897
G 11.90								.21	1.54	R_3	3.2895	4.4679
H 11.69									1.33	R_2	3.1339	4.2837
I 10.35										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 6 — Analysis of Variance Summaries — Personality tests. — Age 9+

Test	Source	SS	df.	MS	F	Sig.
J.E.P.I. Neuroticism	Between classes	295.8473	8	36.9809	1.4408	None
	Within classes	5775.0587	225	25.6669		
	Total	6070.9060	233			
J.E.P.I. Extraversion	Between classes	191.7056	8	23.9632	1.9548	None
	Within classes	2758.1790	225	12.2586		
	Total	2949.8846	233			

Table 7 Analysis of Variance Summaries Personality tests. Age 10+

Test	Source	SS	df.	MS	F	Sig.
J.E.P.I. Neuroticism	Between classes	755.2343	8	94.4043	4.1571	1%
	Within classes	5109.5562	225	22.7091		
	Total	5864.7906	233			
J.E.P.I. Extraversion	Between classes	118.6619	8	14.8327	1.0661	None
	Within classes	3130.4534	225	13.9131		
	Total	3249.1154	233			

Table 8

Significance of differences between means :

Personality Tests. Neuroticism. Age 10+.

Means	A : D	B : A_2	C : B	D : C	E : A_1	F : E_4	G : E_2	H : E_1	I : E_3	Shortest Significant Ranges	5%	1%
A 16.05		1.53	1.87	1.88	3.26	3.39	4.24	4.40	5.74	R_9	3.7572	5.0989
B 14.52			.34	.35	1.73	1.86	2.71	2.87	4.21	R_8	3.7324	5.0601
C 14.18				.01	1.39	1.52	2.37	2.53	3.87	R_7	3.7019	5.0148
D 14.17					1.38	1.51	2.36	2.52	3.86	R_6	3.6621	4.9584
E 12.79						.13	.98	1.14	2.48	R_5	3.6101	4.8876
F 12.66							.85	1.01	2.35	R_4	3.5382	4.7945
G 11.81								.16	1.50	R_3	3.4365	4.6675
H 11.65									1.34	R_2	3.2739	4.4750
I 10.31										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means and Standard Deviations of Classes: Attainment and Ability. Age 8+.

Source	n	Spelling $\bar{x}$	Spelling SD	Reading $\bar{x}$	Reading SD	Number $\bar{x}$	Number SD	Comp/Vocab $\bar{x}$	Comp/Vocab SD	V.Reasoning $\bar{x}$	V.Reasoning SD	Num.Problem Solving $\bar{x}$	Num.Problem Solving SD
Class A_1	29	47.69	9.99	49.17	9.08	44.62	5.14	50.48	8.68	44.97	8.52	51.93	7.40
A_2	31	47.81	7.62	47.19	9.50	46.10	5.06	48.59	7.07	42.94	7.09	50.30	8.10
B	11	50.09	11.28	48.36	9.63	41.45	6.62	48.64	8.71	46.09	10.42	51.36	10.22
C	6	50.17	8.45	45.67	9.42	48.83	4.75	50.00	9.14	51.50	8.67	54.67	13.55
D	37	46.73	7.81	49.24	9.23	40.86	6.28	47.05	9.14	45.68	9.44	45.78	7.50
E_1	31	47.84	8.51	45.97	9.27	39.94	6.83	45.03	7.30	40.23	7.53	48.16	6.00
E_2	31	43.52	9.83	47.13	11.28	42.35	6.79	44.23	8.66	41.39	9.79	48.58	7.64
E_3	29	49.31	8.55	47.93	9.81	40.90	5.73	47.28	9.04	44.17	8.67	47.66	8.60
E_4	29	48.90	7.98	47.14	8.73	42.00	5.13	46.72	6.56	43.45	9.28	47.69	7.17
Total	234	48.21	8.66	47.69	9.50	42.47	6.24	47.16	8.29	43.64	8.91	48.79	7.98

Means and Standard deviations of classes: Attainment and Ability. Age 9+.

Source	n	Spelling $\bar{x}$	Spelling SD	Reading $\bar{x}$	Reading SD	Number $\bar{x}$	Number SD	Comp/Vocab $\bar{x}$	Comp/Vocab SD	V.Reasoning $\bar{x}$	V.Reasoning SD	Num.Problem Solving $\bar{x}$	Num.Problem Solving SD	Spatial Reasoning $\bar{x}$	Spatial Reasoning SD
Class A_1	29	48.83	8.44	52.93	8.92	46.07	7.19	49.17	8.21	47.31	8.36	43.76	5.36	50.79	6.44
A_2	31	44.77	8.44	50.68	12.34	43.97	6.40	48.58	7.07	46.45	7.96	45.23	8.27	51.42	10.06
B	11	49.27	12.71	51.73	11.88	43.73	6.86	48.64	10.54	47.00	6.36	44.27	9.09	53.17	9.30
C	6	43.83	5.81	46.67	13.13	40.50	8.55	46.33	11.29	54.00	5.69	47.00	8.05	52.67	9.16
D	37	44.19	9.07	48.27	9.03	37.84	6.32	46.49	8.97	45.11	8.74	40.16	6.69	48.30	9.67
E_1	31	46.29	9.46	47.74	9.18	37.45	7.82	46.06	7.06	44.42	7.57	41.87	6.52	43.97	6.42
E_2	31	46.42	10.28	49.10	11.03	39.32	7.25	43.71	9.56	43.77	9.56	41.90	7.16	42.74	8.76
E_3	29	48.28	10.22	51.07	8.07	36.45	7.72	46.00	6.92	44.03	8.21	40.93	6.61	43.79	6.44
E_4	29	45.97	9.86	49.21	9.06	39.38	6.69	46.03	5.83	46.28	9.92	39.97	4.97	42.86	7.01
Total	234	46.37	9.51	49.79	9.94	40.18	7.68	46.68	7.88	45.62	8.56	42.18	6.94	46.66	8.71

Means and Standard Deviations of Classes: Attainment and Ability. Age 10+

Source	n	Spelling		Reading		Number		Comp/Vocab		V.Reasoning		Num.Problem Solving		Non-Verbal Reasoning	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Class A_1	29	45.28	6.59	51.48	8.74	42.00	5.05	49.10	9.60	43.14	7.08	42.45	5.44	47.55	6.48
A_2	31	44.42	9.29	51.06	9.57	38.81	7.23	50.48	9.03	42.20	6.75	45.16	9.33	49.48	7.86
B	11	48.82	11.91	53.36	11.10	43.91	6.52	52.18	10.94	44.64	8.78	46.82	8.10	47.64	9.43
C	6	42.67	6.31	55.83	12.54	43.83	8.06	51.00	11.64	52.67	9.16	48.50	7.97	53.17	9.30
D	37	43.16	7.61	50.00	7.31	35.76	5.34	48.86	9.41	44.03	8.89	41.19	5.35	45.51	8.18
E_1	31	45.00	7.72	49.03	7.66	37.48	7.14	48.10	7.52	43.61	8.34	41.52	6.30	45.00	10.03
E_2	31	44.90	8.25	51.55	10.63	37.65	6.74	46.45	10.60	41.74	8.84	42.19	7.79	45.90	8.13
E_3	29	45.28	7.91	54.14	8.66	35.07	6.82	48.76	7.05	40.38	7.97	39.66	5.05	43.07	6.97
E_4	29	44.34	9.60	53.38	8.20	36.31	11.89	48.10	6.72	40.41	7.74	40.14	4.92	42.86	8.26
Total	234	44.75	8.04	51.64	8.96	37.99	6.88	48.80	8.85	42.67	8.23	42.18	6.86	45.94	8.39

Table 12 Analysis of Variance Summaries Attainment tests. Age 8+

Test	Source	SS	df.	MS	F	Sig.
Spelling	Between classes	211.8220	8	26.4777	.3452	None
	Within classes	17258.9174	225	76.7063		
	Total	17470.7393	233			
Reading	Between classes	302.4180	8	37.8022	.4108	None
	Within classes	20705.4282	225	92.0241		
	Total	21007.8462	233			
Number	Between classes	1169.2666	8	146.1583	4.1548	1%
	Within classes	7915.0796	225	35.1781		
	Total	9084.3462	233			
Comp/Vocab	Between classes	868.6158	8	108.5770	1.6145	None
	Within classes	15131.2004	225	67.2498		
	Total	15999.8162	233			
Verbal Reasoning	Between classes	1184.4079	8	148.0510	1.9260	None
	Within classes	17295.4382	225	76.8685		
	Total	18479.8462	233			
Numerical Problem Solving	Between classes	1056.4175	8	132.0522	2.1479	5%
	Within classes	13832.8988	225	61.4796		
	Total	14889.3162	233			

Table 13

Significance of differences between means :

Attainment Tests. Number. Age 8+.

Means		A : C	B : A_2	C : A_1	D : E_2	E : E_4	F : B	G : E_3	H : D	I : E_1
A	48.83									
B	46.10	2.74								
C	44.62	4.21	1.48							
D	42.35	6.48	3.74	2.27						
E	42.00	6.83	4.10	2.62	.35					
F	41.45	7.38	4.64	3.17	.90	.55				
G	40.90	7.94	5.20	3.72	1.46	1.16	.56			
H	40.86	7.97	5.23	3.76	1.49	1.14	.59	.03		
I	39.94	8.90	6.16	4.69	2.42	2.06	1.52	.96	.93	

Shortest Significant Ranges

	5%	1%
R_9	4.0747	5.5697
R_8	4.2771	5.8092
R_7	4.4037	5.9676
R_6	4.4932	6.0832
R_5	4.5579	6.1713
R_4	4.6075	6.2415
R_3	4.6460	6.2979
R_2	4.6763	6.3461

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 14

Significance of differences between means :

Attainment Tests. Numerical Problem Solving. Age 8+.

Means	A : C	B : A_1	C : B	D : A_2	E : E_2	F : E_1	G : E_4	H : E_3	I : D	Shortest Significant Ranges	5%	1%
A 54.67		2.74	3.30	4.38	6.09	6.51	6.98	7.01	8.88	R_9	6.1820	8.3895
B 51.93			.57	1.64	3.35	3.77	4.24	4.28	6.15	R_8	6.1420	8.3258
C 51.36				1.07	2.78	3.20	3.67	3.71	5.58	R_7	6.0911	8.2512
D 50.29					1.71	2.13	2.60	2.64	4.51	R_6	6.0255	8.1584
E 48.58						.42	.89	.93	2.80	R_5	5.9400	8.0419
F 48.16							.47	.51	2.38	R_4	5.8217	7.8891
G 47.69								.03	1.91	R_3	5.6543	7.6798
H 47.66									1.87	R_2	5.3868	7.3631
I 45.78										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 15a — Analysis of Variance Summaries — Attainment tests. — Age 9+

Test	Source	SS	df.	MS	F	Sig.
Spelling	Between classes	671.7116	8	83.9640	.9268	None
	Within classes	20382.9422	225	90.5909		
	Total	21054.6538	233			
Reading	Between classes	698.0248	8	87.2531	.8800	None
	Within classes	22308.7146	225	99.1498		
	Total	23006.7393	233			
Number	Between classes	2468.4713	8	308.5589	6.1537	1%
	Within classes	11281.9903	225	50.1422		
	Total	13750.4615	233			
Comp/Vocab	Between classes	672.7595	8	84.0949	1.3713	None
	Within classes	13798.2020	225	61.3253		
	Total	14470.9615	233			
Verbal Reasoning	Between classes	791.9713	8	98.9964	1.3686	None
	Within classes	16275.1782	225	72.3341		
	Total	17067.1496	233			
Numerical Problem Solving	Between classes	890.8566	8	111.3571	2.4225	5%
	Within classes	10342.9597	225	45.9687		
	Total	11233.8162	233			

Table 15 b — Analysis of Variance Summaries — Attainment tests. — Age 9+

Test	Source	SS	df.	MS	F	Sig.
Non-Verbal Reasoning	Between classes	3047.7603	8	380.9700	5.8571	1%
	Within classes	14634.8893	225	65.0440		
	Total	17682.6496	233			

Table 16

Significance of differences between means :

Attainment Tests. Number. Age 9+.

Means	A : A_1	B : A_2	C : B	D : C	E : E_4	F : E_2	G : D	H : E_1	I : E_3	Shortest Significant Ranges	5%	1%
A 46.07		2.10	2.34	5.57	6.69	6.75	8.23	8.62	9.62	R_9	5.5830	7.5766
B 43.97			.24	3.47	4.59	4.65	6.13	6.52	7.52	R_8	5.5469	7.5191
C 43.73				3.23	4.35	4.40	5.89	6.28	7.28	R_7	5.5008	7.4517
D 40.50					1.12	1.18	2.66	3.05	4.05	R_6	5.4417	7.3679
E 39.38						.06	1.54	1.93	2.93	R_5	5.3644	7.2627
F 39.32							1.48	1.87	2.87	R_4	5.2576	7.1246
G 37.84								.39	1.39	R_3	5.1064	6.9356
H 37.45									1.00	R_2	4.8648	6.6497
I 36.45										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 17

Significance of differences between means :

Attainment Tests. Numerical Problem Solving. Age 9+.

Means	A : C	B : A_2	C : B	D : A_1	E : E_2	F : E_1	G : E_3	H : D	I : E_4	Shortest Significant Ranges	5%	1%
A 47.00		1.77	2.73	3.24	5.10	5.13	6.07	6.84	7.03	R_9	5.3467	7.2559
B 45.23			.95	1.47	3.32	3.35	4.30	5.06	5.26	R_8	5.3120	7.2008
C 44.27				.52	2.37	2.40	3.34	4.11	4.31	R_7	5.2680	7.1362
D 43.76					1.85	1.89	2.83	3.59	3.79	R_6	5.2113	7.0560
E 41.90						.03	.97	1.74	1.94	R_5	5.1373	6.9552
F 41.87							.94	1.71	1.91	R_4	5.0350	6.8230
G 40.93								.77	.97	R_3	4.8902	6.6420
H 40.16									.20	R_2	4.6589	6.3682
I 39.97										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 18

Significance of differences between means :

Attainment Tests. Spatial Reasoning. Age 9+.

Means	A : B	B : C	C : A_2	D : A_1	E : D	F : E_1	G : E_3	H : E_4	I : E_2	Shortest Significant Ranges	5%	1%
A 53.17		.50	1.75	2.37	4.87	9.20	9.37	10.30	10.42	R_9	6.3587	8.6293
B 52.67			1.25	1.87	4.37	8.70	8.87	9.80	9.92	R_8	6.3176	8.5638
C 51.42				.63	3.12	7.45	7.63	8.56	8.68	R_7	6.2651	8.4870
D 50.79					2.50	6.83	7.00	7.93	8.05	R_6	6.1978	8.3916
E 48.30						4.33	4.50	5.44	5.56	R_5	6.1098	8.2718
F 43.97							.17	1.11	1.23	R_4	5.9881	8.1145
G 43.79								.93	1.05	R_3	5.8159	7.8993
H 42.86									.12	R_2	5.5407	7.5736
I 42.74										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are not significantly different.

Table 19 a — Analysis of Variance Summaries — Attainment tests. — Age 10+

Test	Source	SS	df.	MS	F	Sig.
Spelling	Between classes	335.7829	8	41.9729	.6420	None
	Within classes	14709.8410	225	65.3771		
	Total	15045.6239	233			
Reading	Between classes	728.4340	8	91.0542	1.1408	None
	Within classes	17959.4122	225	79.8196		
	Total	18687.8462	233			
Number	Between classes	1602.6619	8	200.3327	4.7859	1%
	Within classes	9418.2996	225	41.8591		
	Total	11020.9615	233			
Comp/Vocab	Between classes	445.9599	8	55.7450	.7045	None
	Within classes	17804.7794	225	79.1324		
	Total	18250.7393	233			
Verbal Reasoning	Between classes	1077.7089	8	134.7136	2.0633	5%
	Within classes	14690.2911	225	65.2902		
	Total	15768.0000	233			
Numerical Problem Solving	Between classes	1109.7029	8	138.7129	3.1690	1%
	Within classes	9848.7586	225	43.7723		
	Total	10958.4615	233			

Table 19 b — Analysis of Variance Summaries — Attainment tests. — Age 10+

Test	Source	SS	df.	MS	F	Sig.
Non-Verbal Reasoning	Between classes	1357.6060	8	169.7007	2.5402	5%
	Within classes	15031.5564	225	66.8069		
	Total	16389.1624	233			

Table 20

Significance of differences between means :

Attainment Tests. Number. Age 10+.

Means	A : B	B : C	C : A_1	D : A_2	E : E_2	F : E_1	G : E_4	H : D	I : E_3	Shortest Significant Ranges	5%	1%
A 43.91		.08	1.91	5.10	6.26	6.43	7.60	8.15	8.84	R_9	5.1011	6.9226
B 43.83			1.83	5.03	6.19	6.35	7.52	8.08	8.76	R_8	5.0680	6.8700
C 42.00				3.19	4.35	4.52	5.69	6.24	6.93	R_7	5.0260	6.8084
D 38.81					1.16	1.32	2.50	3.05	3.74	R_6	4.9719	6.7319
E 37.65						.16	1.33	1.89	2.58	R_5	4.9014	6.6358
F 37.48							1.17	1.73	2.41	R_4	4.8038	6.5096
G 36.31								.55	1.24	R_3	4.6656	6.3369
H 35.76									.69	R_2	4.4449	6.0756
I 35.07										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 21

Significance of differences between means :

Attainment Tests. Verbal Reasoning. Age 10+.

Means	A : C	B : B	C : D	D : E_1	E : A_1	F : A_2	G : E_2	H : E_4	I : E_3	Shortest Significant Ranges	5%	1%
A 52.67		8.03	8.64	9.05	9.53	10.47	10.92	12.25	12.29	R_9	6.3708	8.6456
B 44.64			.61	1.02	1.50	2.44	2.89	4.22	4.25	R_8	6.3295	8.5800
C 44.03				.41	.89	1.83	2.29	3.61	3.65	R_7	6.2770	8.5031
D 43.61					.48	1.42	1.87	3.20	3.23	R_6	6.2095	8.4074
E 43.14						.94	1.40	2.72	2.76	R_5	6.1213	8.2874
F 42.19							.45	1.78	1.81	R_4	5.9994	8.1299
G 41.74								1.33	1.36	R_3	5.8269	7.9142
H 40.41									.03	R_2	5.5512	7.5879
I 40.38										df =	18.5634	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 22

Significance of differences between means :

Attainment Tests. Numerical Problem Solving. Age 10+.

Means	A : C	B : B	C : A_2	D : A_1	E : E_2	F : E_1	G : D	H : E_4	I : E_3	Shortest Significant Ranges	5%	1%
A 48.50		1.68	3.34	6.05	6.31	6.98	7.31	8.36	9.36	R_9	5.2163	7.0790
B 46.82			1.66	4.37	4.62	5.30	5.63	6.68	7.68	R_8	5.1826	7.3047
C 45.16				2.71	2.97	3.65	3.97	5.02	6.02	R_7	5.1396	6.9623
D 42.45					.25	.93	1.26	2.31	3.31	R_6	5.0843	6.8840
E 42.19						.68	1.00	2.06	3.06	R_5	5.0121	6.7857
F 41.52							.33	1.38	2.38	R_4	4.9123	6.6567
G 41.19								1.05	2.05	R_3	4.7710	6.4801
H 40.14									1.00	R_2	4.5453	6.2129
I 39.14										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 23

Significance of differences between means :

Attainment Tests. Spatial Reasoning. Age 10+.

Means	A : C	B : A_2	C : B	D : A_1	E : E_2	F : D	G : E_1	H : E_3	I : E_4	Shortest Significant Ranges	5%	1%
A 53.17		3.68	5.53	5.62	7.26	7.65	8.17	10.10	10.30	R_9	6.4443	8.7455
B 49.48			1.85	1.93	3.58	3.97	4.48	6.41	6.62	R_8	6.4026	8.6791
C 47.64				.08	1.73	2.12	2.64	4.57	4.77	R_7	6.3495	8.6013
D 47.55					1.65	2.04	2.55	4.48	4.69	R_6	6.2812	8.5045
E 45.90						.39	.90	2.83	3.04	R_5	6.1920	8.3831
F 45.51							.51	2.44	2.65	R_4	6.0687	8.2238
G 45.00								1.93	2.14	R_3	5.8942	8.0056
H 43.07									.21	R_2	5.6153	7.6755
I 42.86										df =	18.5634	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means and Standard Deviations of Classes: Attitudes towards curriculum. Age 8+.

Source	n	Composition $\bar{x}$	Composition SD	Reading $\bar{x}$	Reading SD	Maths $\bar{x}$	Maths SD	P.E. $\bar{x}$	P.E. SD	Art $\bar{x}$	Art SD
Class A_1	29	5.97	1.78	3.76	1.83	3.86	2.55	4.90	2.93	6.90	1.54
A_2	31	4.94	1.82	6.19	1.40	2.81	1.68	5.94	1.24	3.58	2.25
B	11	4.09	2.12	5.45	2.38	6.18	1.72	6.73	1.68	5.36	2.38
C	6	7.33	1.21	6.83	1.83	3.67	3.01	6.17	1.47	6.67	2.07
D	37	4.43	2.60	6.32	2.21	4.95	2.37	6.65	2.06	5.78	2.53
E_1	31	5.32	2.20	4.94	1.91	4.23	2.36	6.45	1.79	7.13	1.54
E_2	31	5.81	1.89	5.26	1.67	3.55	2.38	7.90	0.30	7.16	1.37
E_3	29	6.00	2.10	5.72	2.33	4.86	2.70	6.72	2.28	7.28	1.60
E_4	29	5.10	2.48	4.83	2.55	3.24	2.23	6.48	1.98	7.10	1.35
Total	234	5.32	2.21	5.38	2.16	4.28	2.03	6.46	2.05	6.34	2.20

Means and Standard deviations of Classes: Attitudes towards curriculum. Age 9+.

Source	n	Composition $\bar{x}$	Composition SD	Reading $\bar{x}$	Reading SD	Maths $\bar{x}$	Maths SD	P.E. $\bar{x}$	P.E. SD	Art $\bar{x}$	Art SD
Class A_1	29	6.76	1.88	4.52	1.86	4.79	2.37	6.72	2.25	6.48	2.05
A_2	31	6.42	1.50	5.42	1.69	3.97	1.80	6.03	1.68	5.97	2.09
B	11	4.27	2.45	4.73	2.61	3.91	1.76	6.73	1.35	5.18	2.48
C	6	4.00	1.90	4.33	0.82	4.50	0.55	7.00	1.55	7.17	1.17
D	37	4.24	1.88	4.51	2.33	3.03	2.06	5.49	2.21	6.81	1.58
E_1	31	4.03	1.76	5.00	2.19	4.10	2.23	7.32	1.28	5.97	1.40
E_2	31	4.81	1.87	4.35	2.14	3.55	2.11	7.03	1.22	5.81	2.11
E_3	29	5.03	1.95	4.93	2.00	3.52	1.99	6.00	2.14	5.69	1.98
E_4	29	3.34	1.84	4.66	2.30	2.66	1.37	6.34	1.65	6.31	1.51
Total	234	4.87	2.14	4.75	2.09	3.68	2.05	6.43	1.87	5.72	2.08

Means and Standard Deviations of Classes: Attitudes towards Curriculum, Age 10+

Source	n	Composition $\bar{x}$	Composition SD	Reading $\bar{x}$	Reading SD	Maths $\bar{x}$	Maths SD	P.E. $\bar{x}$	P.E. SD	Art $\bar{x}$	Art SD
Class A_1	29	5.83	1.91	4.38	1.95	4.35	2.27	5.69	2.22	6.04	1.50
A_2	31	5.36	2.01	4.90	1.56	4.13	1.26	5.84	1.81	5.97	1.99
B	11	4.82	1.40	6.36	2.29	5.00	2.00	6.36	2.11	5.91	1.58
C	6	3.83	1.60	3.83	0.41	4.83	1.17	6.50	1.64	6.67	1.63
D	37	4.54	2.52	5.43	2.44	3.68	2.08	5.16	2.39	6.05	2.16
E_1	31	4.39	1.91	4.81	1.89	4.55	1.59	6.00	1.69	6.39	1.50
E_2	31	5.71	1.66	4.61	1.61	3.74	1.88	6.68	1.55	6.16	1.72
E_3	29	4.79	2.24	5.31	1.76	3.89	1.63	6.66	1.68	6.10	1.80
E_4	29	4.45	1.81	4.38	1.90	3.00	1.85	5.55	2.13	7.10	1.65
Total	234	4.96	2.06	4.90	1.95	3.94	1.90	5.95	1.89	6.24	1.78

Table 27 Analysis of Variance Summaries. Attitudes. Age 8+

Test	Source	SS	df.	MS	F	Sig.
Composition	Between classes	108.8537	8	13.6067	2.9653	1%
	Within classes	1032.4625	225	4.5887		
	Total	1141.3162	233			
Reading	Between classes	161.3507	8	20.16884	4.8819	1%
	Within classes	929.5552	225	4.1314		
	Total	1090.9059	233			
Maths.	Between classes	176.3806	8	22.0476	4.0562	1%
	Within classes	1223.0040	225	5.4356		
	Total	1399.3846	233			
P.E.	Between classes	148.6429	8	18.5804	5.0282	1%
	Within classes	831.4298	225	3.6952		
	Total	980.0726	233			
Art	Between classes	350.1023	8	43.7628	12.6800	1%
	Within classes	776.5473	225	3.4513		
	Total	1126.6496	233			

Table 28

Significance of differences between means :

Attitude Tests. Composition. Age 8+.

Means	A : C	B : E_3	C : A_1	D : E_2	E : E_1	F : E_4	G : A_2	H : D	I : B	Shortest Significant Ranges	5%	1%
A 7.33		1.33	1.36	1.52	2.01	2.23	2.39	2.90	3.24	R_9	1.6889	2.2920
B 6.00			.03	.19	.68	.90	1.06	1.57	1.91	R_8	1.6780	2.2746
C 5.97				.16	.65	.87	1.03	1.54	1.88	R_7	1.6641	2.2542
D 5.81					.49	.71	.87	1.38	1.72	R_6	1.6462	2.2289
E 5.32						.22	.38	.89	1.23	R_5	1.6228	2.1971
F 5.10							.16	.67	1.01	R_4	1.5905	2.1553
G 4.94								.51	.85	R_3	1.5447	2.0981
H 4.43									.34	R_2	1.4717	2.0116
I 4.09										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 29

Significance of differences between means :

Attitude Tests. Reading. Age 8+.

Means	A : C	B : D	C :	D :	E :	F :	G :	H :	I :	Shortest Significant Ranges	5%	1%
A 6.83		.51	.64	1.11	1.38	1.58	1.90	2.01	3.07	R_9	1.6026	2.1748
B 6.32			.13	.60	.87	1.07	1.39	1.50	2.57	R_8	1.5922	2.1583
C 6.19				.47	.74	.93	1.26	1.37	2.43	R_7	1.5790	2.1390
D 5.72					.27	.47	.79	.90	1.97	R_6	1.5620	2.1149
E 5.45						.20	.52	.63	1.70	R_5	1.5398	2.0847
F 5.26							.33	.43	1.50	R_4	1.5092	2.0451
G 4.94								.11	1.18	R_3	1.4658	1.9908
H 4.83									1.07	R_2	1.3964	1.9087
I 3.76										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 30

Significance of differences between means :

Attitude Tests. Maths. Age 8+.

Means	A : B	B : D	C : E_3	D : E_1	E : A_1	F : C	G : E_2	H : E_4	I : A_2
A 6.18		1.24	1.32	1.96	2.32	2.52	2.63	2.94	3.38
B 4.95			.08	.72	1.08	1.28	1.40	1.70	2.14
C 4.86				.64	1.00	1.20	1.31	1.62	2.06
D 4.23					.36	.56	.68	.98	1.42
E 3.86						.20	.31	.62	1.06
F 3.67							.12	.43	.86
G 3.55								.31	.74
H 3.2414									.43
I 2.81									

Shortest Significant Ranges	5%	1%
R_9	1.8382	2.4946
R_8	1.8273	2.4756
R_7	1.8111	2.4534
R_6	1.7917	2.4258
R_5	1.7662	2.3912
R_4	1.7310	2.3458
R_3	1.6813	2.2835
R_2	1.6017	2.1894

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 31

Significance of differences between means :

Attitude Tests. P.E. Age 8+.

Means	A : E_2	B : B	C : E_3	D : D	E : E_4	F : E_1	G : C	H : A_2	I : A_1	Shortest Significant Ranges	5%	1%
A 7.90		1.18	1.18	1.25	1.42	1.45	1.74	1.97	3.01	R_9	1.5156	2.0568
B 6.73			.00	.08	.24	.28	.56	.79	1.83	R_8	1.5058	2.0412
C 6.72				.08	.24	.27	.56	.79	1.83	R_7	1.4933	2.0229
D 6.65					.17	.20	.48	.71	1.75	R_6	1.4772	2.0001
E 6.48						.03	.32	.55	1.59	R_5	1.4563	1.9716
F 6.45							.28	.52	1.56	R_4	1.4273	1.9341
G 6.17								.23	1.27	R_3	1.3862	1.8828
H 5.94									1.04	R_2	1.3206	1.8052
I 4.90										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 32

Significance of differences between means :

Attitude Tests. Art. Age 8+.

Means	A : E_3	B : E_2	C : E_1	D : E_4	E : A_1	F : C	G : D	H : B	I : A_2
A 7.28		.11	.15	.17	.38	.61	1.50	1.91	3.70
B 7.16			.03	.06	.26	.49	1.38	1.80	3.58
C 7.13				.03	.23	.46	1.35	1.77	3.55
D 7.10					.21	.44	1.32	1.74	3.52
E 6.90						.23	1.11	1.53	3.31
F 6.67							.88	1.30	3.09
G 5.78								.42	2.20
H 5.36									1.78
I 3.58									

Shortest Significant Ranges	5%	1%
R_9	1.4647	1.9878
R_8	1.4552	1.9727
R_7	1.4432	1.9550
R_6	1.4277	1.9330
R_5	1.4074	1.9054
R_4	1.3794	1.8692
R_3	1.3397	1.8196
R_2	1.2763	1.7446

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 33 Analysis of Variance Summaries. Attitudes. Age 9+

Test	Source	SS	df.	MS	F	Sig.
Composition	Between classes	290.9788	8	36.3723	10.6121	1%
	Within classes	771.1751	225	3.4274		
	Total	1062.1538	233			
Reading	Between classes	26.5652	8	3.3207	.7539	None
	Within classes	991.0587	225	4.4047		
	Total	1017.6239	233			
Maths.	Between classes	96.0276	8	12.0035	3.0507	1%
	Within classes	885.2886	225	3.9346		
	Total	981.3162	233			
P.E.	Between classes	84.7854	8	10.5982	3.2644	1%
	Within classes	730.4796	225	3.2466		
	Total	815.2650	233			
Art	Between classes	48.4851	8	6.0606	1.7628	None
	Within classes	773.5747	225	3.4381		
	Total	822.0598	233			

Table 34

Significance of differences between means :

Attitude Tests. Composition. Age 9+.

Means	A : A_1	B : A_2	C : E_3	D : E_2	E : B	F : D	G : E_1	H : C	I : E_4	Shortest Significant Ranges	5%	1%
A 6.76		.34	1.72	1.95	2.49	2.52	2.73	2.76	3.41	R_9	1.4597	1.9809
B 6.42			1.38	1.61	2.15	2.18	2.39	2.42	3.07	R_8	1.4502	1.9658
C 5.04				.23	.77	.80	1.01	1.04	1.69	R_7	1.4382	1.9482
D 4.81					.54	.57	.78	.81	1.46	R_6	1.4227	1.9263
E 4.27						.03	.24	.27	.92	R_5	1.4025	1.8988
F 4.24							.21	.24	.89	R_4	1.3746	1.8627
G 4.03								.03	.68	R_3	1.3350	1.8133
H 4.00									.65	R_2	1.2719	1.7385
I 3.35										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 35

Significance of differences between means :

Attitude Tests. Maths. Age 9+.

Means	A : A_1	B : C	C : E_1	D : A_2	E : B	F : E_2	G : E_3	H : D	I : E_4	Shortest Significant Ranges	5%	1%
A 4.79		.29	.70	.83	.88	1.24	1.28	1.77	2.14	R_9	1.5639	2.1224
B 4.50			.40	.53	.59	.95	.98	1.47	1.84	R_8	1.5538	2.1063
C 4.10				.13	.19	.55	.58	1.07	1.44	R_7	1.5409	2.0874
D 3.97					.06	.42	.45	.94	1.31	R_6	1.5243	2.0639
E 3.91						.36	.39	.88	1.25	R_5	1.5027	2.0344
F 3.55							.03	.52	.89	R_4	1.4728	1.9958
G 3.52								.49	.86	R_3	1.4304	1.9428
H 3.02									.37	R_2	1.3627	1.8627
I 2.66										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 36

Significance of differences between means :

Attitude Tests. P.E. Age 9+.

Means	A : E_1	B : E_2	C : C	D : B	E : A_1	F : E_4	G : A_2	H : E_3	I : D
A 7.32		.29	.32	.60	.59	.98	1.29	1.32	1.84
B 7.03			.03	.31	.31	.69	1.00	1.03	1.55
C 7.00				.27	.28	.66	.97	1.00	1.51
D 6.73					.00	.38	.70	.73	1.24
E 6.72						.38	.69	.72	1.23
F 6.34							.31	.34	.86
G 6.03								.03	.55
H 6.00									.51
I 5.49									

Shortest Significant Ranges	5%	1%
R_9	1.4206	1.9279
R_8	1.4114	1.9133
R_7	1.3997	1.8961
R_6	1.3847	1.8748
R_5	1.3650	1.8480
R_4	1.3378	1.8129
R_3	1.2994	1.7648
R_2	1.2379	1.6920

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 37 Analysis of Variance Summaries. Attitudes. Age 10+

Test	Source	SS	df.	MS	F	Sig.
Composition	Between classes	77.0061	8	9.6258	2.3838	5%
	Within classes	908.5665	225	4.0381		
	Total	985.5726	233			
Reading	Between classes	64.3133	8	8.0392	2.2080	5%
	Within classes	819.2252	225	3.6410		
	Total	883.5385	233			
Maths.	Between classes	66.8603	8	8.3575	2.4440	5%
	Within classes	769.4175	225	3.4196		
	Total	836.2778	233			
P.E.	Between classes	64.5116	8	8.0640	2.1001	5%
	Within classes	863.9713	225	3.8399		
	Total	928.4829	233			
Art	Between classes	30.1201	8	3.7650	1.1915	None
	Within classes	710.9953	225	3.1600		
	Total	741.1154	233			

Table 38

Significance of differences between means :

Attitude Tests. Composition. Age 10+.

Means	A : A_1	B : E_2	C : A_2	D : B	E : E_3	F : D	G : E_4	H : E_1	I : C
A 5.83		.12	.47	1.01	1.04	1.29	1.38	1.44	2.00
B 5.71			.35	.89	.92	1.17	1.26	1.32	1.88
C 5.36				.54	.57	.82	.91	.97	1.53
D 4.82					.03	.28	.37	.43	.99
E 4.79						.25	.34	.40	.96
F 4.54							.09	.15	.71
G 4.45								.06	.62
H 4.39									.56
I 3.83									

Shortest Significant Ranges	5%	1%
R_9	1.5844	2.1501
R_8	1.5741	2.1338
R_7	1.5610	2.1147
R_6	1.5443	2.0909
R_5	1.5223	2.0610
R_4	1.4920	2.0219
R_3	1.4491	1.9682
R_2	1.3805	1.8871

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 39

Significance of differences between means :

Attitude Tests. Reading. Age 10+.

Means	A : B	B : D	C : E_3	D : A_2	E : E_1	F : E_2	G : A_1	H : E_4	I : C
A 6.36		.93	1.05	1.46	1.55	1.75	1.98	1.98	2.53
B 5.43			.12	.53	.62	.82	1.05	1.05	1.60
C 5.31				.41	.50	.70	.93	.12	1.48
D 4.90					.09	.29	.52	.52	1.07
E 4.81						.20	.43	.43	.98
F 4.61							.23	.23	.78
G 4.38								.0	.55
H 4.38									.55
I 3.83									

Shortest Significant Ranges	5%	1%
R_9	1.5044	2.0417
R_8	1.4947	2.0262
R_7	1.4823	2.0080
R_6	1.4664	1.9854
R_5	1.4455	1.9571
R_4	1.4168	1.9199
R_3	1.3760	1.8689
R_2	1.3109	1.7919

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 40

Significance of differences between means :

Attitude Tests. Maths. Age 10+.

Means	A : B	B : C	C : E_1	D : A_1	E : A_2	F : E_3	G : E_2	H : D	I : E_4	Shortest Significant Ranges	5%	1%
A 5.00		.17	.45	.65	.87	1.11	1.26	1.32	2.0	R_9	1.4580	1.9786
B 4.83			.28	.48	.70	.94	1.09	1.15	1.83	R_8	1.4485	1.9636
C 4.55				.20	.42	.66	.81	.87	1.55	R_7	1.4365	1.9460
D 4.35					.22	.46	.61	.67	1.35	R_6	1.4211	1.9241
E 4.13						.24	.39	.45	1.13	R_5	1.4009	1.8966
F 3.89							.15	.21	.89	R_4	1.3730	1.8606
G 3.74								.06	.74	R_3	1.3335	1.8112
H 3.68									.68	R_2	1.2704	1.7365
I 3.00										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 41

Significance of differences between means :

Attitude Tests. P.E. Age 10+.

Means	A : E_2	B : E_3	C : C	D : B	E : E_1	F : A_2	G : A_1	H : E_4	I : D
A 6.68		.02	.18	.32	.68	.84	.99	1.13	1.52
B 6.66			.16	.30	.66	.82	.97	1.11	1.50
C 6.50				.14	.50	.66	.81	.95	1.34
D 6.36					.36	.52	.67	.81	1.20
E 6.00						.16	.31	.45	.84
F 5.84							.15	.29	.68
G 5.69								.14	.53
H 5.55									.39
I 5.16									

Shortest Significant Ranges	5%	1%
R_9	1.5450	2.0967
R_8	1.5350	2.0808
R_7	1.5223	2.0621
R_6	1.5059	2.0389
R_5	1.4845	2.0098
R_4	1.4549	1.9716
R_3	1.4131	1.9193
R_2	1.3462	1.8402

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means and Standard Deviations of Classes: Attitudes to School. Age 8+.

Source	n	Attitude to School $\bar{x}$	Attitude to School SD	Interest in School $\bar{x}$	Interest in School SD	Importance Doing Well $\bar{x}$	Importance Doing Well SD	Attitude to Class $\bar{x}$	Attitude to Class SD	Other Image $\bar{x}$	Other Image SD	Conforming v Non-Conforming $\bar{x}$	Conforming v Non-Conforming SD	Rel. with Teacher $\bar{x}$	Rel. with Teacher SD
Class A_1	29	2.59	1.86	2.83	1.61	5.76	2.52	8.72	2.90	1.90	1.01	2.10	1.52	1.34	1.40
A_2	31	2.90	1.49	2.77	1.56	7.10	1.64	11.29	2.62	2.97	1.02	2.74	1.50	1.81	1.20
B	11	2.09	1.87	3.18	1.89	7.00	1.84	10.09	4.48	2.18	0.87	3.09	1.45	1.64	1.43
C	6	3.00	1.79	3.50	1.22	5.83	2.04	12.00	3.16	3.00	0.00	2.17	1.94	1.50	1.22
D	31	2.11	2.08	2.62	1.59	6.38	2.03	8.51	3.98	2.57	1.28	2.68	1.73	1.81	1.73
E_1	31	3.00	1.93	3.03	1.72	6.45	2.10	7.81	3.54	2.87	1.26	3.06	1.69	2.55	1.41
E_2	31	2.97	2.17	2.71	2.00	6.26	2.49	7.55	3.77	2.84	1.21	2.71	1.44	2.00	1.53
E_3	29	3.48	2.37	2.90	1.61	6.62	2.74	7.28	3.45	3.00	1.46	2.80	1.93	2.17	1.58
E_4	29	2.17	2.04	2.41	1.74	5.59	2.24	6.93	4.10	2.79	1.90	1.90	1.35	1.72	1.36
Total	234	2.71	2.02	2.79	1.68	6.34	2.25	8.50	3.80	2.69	1.32	2.61	1.63	1.89	1.48

Means and Standard Deviations of Classes: Attitudes to School. Age 8+.

Source		Anxiety $\bar{x}$	Anxiety SD	Social Adjustment $\bar{x}$	Social Adjustment SD	Self Image $\bar{x}$	Self Image SD
Class A_1	29	3.03	1.27	1.97	1.05	8.90	1.90
A_2	31	2.87	1.23	1.84	1.07	9.90	2.41
B	11	3.00	0.89	2.45	1.21	9.18	2.89
C	6	3.17	0.75	0.83	0.41	10.33	2.07
D	37	2.35	1.48	2.46	1.28	9.68	3.25
E_1	31	2.61	1.31	2.03	0.98	7.42	4.01
E_2	31	3.35	1.64	1.74	1.50	6.94	3.42
E_3	29	3.24	1.50	2.66	2.52	6.38	2.98
E_4	29	2.86	1.60	1.69	1.17	5.62	2.91
Total	234	2.90	1.42	2.29	1.04	8.03	3.37

Means and Standard Deviations of Classes: Attitudes towards School. Age 9+

Source	n	Attitude to School		Interest in School		Importance Doing Well		Attitude to Class		Other Image		Conforming v Non-Conforming		Rel. with Teacher	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Class A_1	29	3.90	1.59	3.45	1.64	6.48	2.20	11.38	3.05	2.66	1.20	2.10	1.52	1.72	1.33
A_2	31	2.74	1.44	2.55	1.31	6.61	1.80	9.68	4.35	2.35	1.38	1.81	0.95	1.32	1.19
B	11	2.91	1.45	2.82	1.60	5.45	2.34	10.75	3.44	3.09	0.94	2.64	1.29	1.82	1.40
C	6	4.50	1.87	3.50	1.38	5.00	1.79	12.83	3.06	4.33	1.37	2.67	1.63	2.67	1.86
D	37	2.16	1.55	1.95	1.45	5.97	1.92	9.51	4.55	2.65	1.46	1.89	1.54	1.76	1.48
E_1	31	3.55	1.80	3.06	1.61	6.29	2.08	9.26	4.97	3.16	1.19	2.97	1.05	1.94	1.18
E_2	31	2.42	1.95	2.06	1.44	5.61	2.49	9.06	4.79	2.81	1.17	2.68	1.33	1.10	1.04
E_3	29	3.52	2.00	3.28	1.75	7.00	2.68	10.17	4.23	3.28	1.10	3.24	1.38	1.61	1.97
E_4	29	2.34	1.63	2.83	1.20	5.62	1.92	11.24	3.30	3.17	1.34	1.97	1.27	1.90	1.08
Total	234	2.96	1.81	2.73	1.57	6.15	2.19	10.11	4.24	2.91	1.30	2.39	1.38	1.70	1.33

Means and Standard Deviations of Classes: Attitudes to School. Age 9+.

Source	n	Anxiety $\bar{x}$	Anxiety SD	Social Adjustment $\bar{x}$	Social Adjustment SD	Self Image $\bar{x}$	Self Image SD
Class A_1	29	3.28	1.51	2.45	1.15	9.07	2.56
A_2	31	2.97	1.40	2.45	1.15	9.06	2.57
B	11	3.18	1.08	2.55	1.37	8.27	2.87
C	6	3.50	1.87	2.50	1.05	11.17	1.72
D	37	2.08	1.55	2.59	1.30	8.43	2.32
E_1	31	2.61	1.61	1.93	1.35	9.74	2.74
E_2	31	3.29	1.27	2.74	1.15	9.32	3.29
E_3	29	3.07	1.31	2.34	1.32	9.24	3.08
E_4	29	3.10	1.50	2.00	1.22	8.38	3.16
Total	234	2.91	1.49	2.41	1.24	9.04	2.74

Means and Standard Deviations of Classes: Attitudes to School. Age 10+

Source	n	Attitude to School $\bar{x}$	Attitude to School SD	Interest in School Work $\bar{x}$	Interest in School Work SD	Importance Doing Well $\bar{x}$	Importance Doing Well SD	Attitude to Class $\bar{x}$	Attitude to Class SD	Other Image $\bar{x}$	Other Image SD	Conforming $\bar{x}$	Conforming SD	Rel. with Teacher $\bar{x}$	Rel. with Teacher SD
Class A_1	29	3.83	1.37	2.66	1.42	6.10	2.41	11.24	4.07	2.48	1.33	1.97	1.12	1.55	1.53
A_2	31	3.07	1.77	2.58	1.31	6.10	2.60	11.23	4.15	2.32	1.30	1.68	1.05	1.58	1.31
B	11	4.09	1.30	3.00	1.27	7.64	1.29	11.09	2.51	3.73	1.10	2.82	1.33	2.27	1.49
C	6	4.67	2.34	3.67	1.97	5.50	2.59	12.67	2.73	3.83	1.47	2.33	1.63	2.17	1.33
D	37	2.65	1.84	1.92	1.67	6.03	2.19	7.97	4.08	2.60	1.57	2.00	1.35	1.22	1.27
E_1	31	3.68	1.83	2.90	1.22	5.81	1.62	9.29	4.44	3.26	0.97	3.23	1.20	2.03	1.17
E_2	31	3.10	1.74	2.71	1.55	6.68	2.09	11.32	3.51	3.13	1.15	2.13	1.23	1.71	1.19
E_3	29	3.86	1.71	3.35	1.37	6.86	1.79	12.55	1.98	3.28	1.10	2.83	1.51	2.04	1.30
E_4	29	2.97	1.88	2.69	1.69	6.31	1.93	11.00	4.04	3.28	1.36	1.79	1.29	1.62	1.32
Total	234	3.36	1.79	2.70	1.52	6.35	1.97	10.64	3.99	2.96	1.33	2.26	1.36	1.71	1.32

Means and Standard Deviations of Classes: Attitudes to School. Age 10+

Source	n	Anxiety $\bar{x}$	Anxiety SD	Social Adjustment $\bar{x}$	Social Adjustment SD	Self Image $\bar{x}$	Self Image SD
Class A_1	29	2.86	1.43	3.10	1.26	8.28	3.57
A_2	31	2.77	1.48	2.90	1.17	9.94	3.42
B	11	3.46	1.75	3.36	1.29	9.73	3.74
C	6	3.17	1.33	2.33	1.21	9.50	4.23
D	37	1.81	1.24	2.54	0.87	9.08	3.17
E_1	31	2.52	1.50	2.71	1.16	10.36	2.54
E_2	31	3.61	1.48	2.90	1.25	9.58	2.62
E_3	29	3.10	0.86	2.97	1.05	9.62	3.26
E_4	29	2.66	1.37	2.79	0.98	8.75	2.70
Total	234	2.78	1.45	2.85	1.12	9.40	3.14

Table 45 a — Analysis of Variance Summaries — Attitude tests. — Age 8+

Test	Source	SS	df.	MS	F	Sig.
To School	Between classes	50.0860	8	6.2607	1.5712	None
	Within classes	896.5679	225	3.9847		
	Total	946.6538	233			
Interest in School	Between classes	12.2640	8	1.5330	.5335	None
	Within classes	646.4753	225	2.8732		
	Total	658.7393	233			
Importance of Doing Well	Between classes	53.2980	8	6.6623	1.3253	None
	Within classes	1131.0310	225	5.0268		
	Total	1184.3291	233			
To Class	Between classes	501.9962	8	62.7495	4.9185	1%
	Within classes	2870.5038	225	12.7578		
	Total	3372.5000	233			
'Other image'	Between classes	29.4156	8	3.6770	2.1840	5%
	Within classes	378.8109	225	1.6836		
	Total	408.2265	233			
Conforming	Between classes	35.7160	8	4.4645	1.7197	None
	Within classes	584.1130	225	2.5961		
	Total	619.8291	233			

Table 45 b — Analysis of Variance Summaries — Attitude tests. — Age 8+

Test	Source	SS	df.	MS	F	Sig.
Relationship with Teacher	Between classes	27.6090	8	3.4511	1.6020	None
	Within classes	484.7200	225	2.1543		
	Total	512.3291	233			
Anxiety in Class	Between classes	24.6131	8	3.0766	1.5489	None
	Within classes	446.9254	225	1.9863		
	Total	471.5385	233			
Social Adjustment	Between classes	35.8139	8	4.4767	2.2257	5%
	Within classes	452.5707	225	2.0114		
	Total	488.3846	233			
Self Image	Between classes	573.2389	8	71.6549	7.7603	1%
	Within classes	2077.5517	225	9.2336		
	Total	2650.7906	233			

Table 46

Significance of differences between means :

Attitude Tests. Attitude to Class. Age 8+.

Means	A : C	B : A_2	C : B	D : A_1	E : D	F : E_1	G : E_2	H : E_3	I : E_4	Shortest Significant Ranges	5%	1%
A 12.00		.71	1.91	3.28	3.49	4.19	4.45	4.72	5.07	R_9	2.8161	3.8217
B 11.29			1.20	2.57	2.78	3.48	3.74	4.01	4.36	R_8	2.7979	3.7927
C 10.10				1.37	1.58	2.28	2.54	2.81	3.16	R_7	2.7747	3.7587
D 8.72					.21	.92	1.18	1.45	1.79	R_6	2.7448	3.7164
E 8.51						.71	.97	1.24	1.58	R_5	2.7059	3.6634
F 7.81							.26	.53	.88	R_4	2.6520	3.5938
G 7.55								.27	.62	R_3	2.5757	3.4984
H 7.28									.34	R_2	2.4539	3.3542
I 6.93										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 47

Significance of differences between means :

Attitude Tests. Other Image. Age 8+.

Means	A : C	B : E_3	C : A_2	D : E_1	E : E_2	F : E_4	G : D	H : B	I : A_1	Shortest Significant Ranges	5%	1%
A 3.00			.03	.13	.16	.21	.43	.82	1.10	R_9	1.0230	1.3883
B 3.00			.03	.13	.16	.21	.43	.82	1.10	R_8	1.0164	1.3778
C 2.97				.10	.13	.17	.40	.79	1.07	R_7	1.0080	1.3659
D 2.87					.03	.08	.30	.69	.97	R_6	.9971	1.3501
E 2.84						.05	.27	.66	.94	R_5	.9830	1.3308
F 2.79							.23	.61	.90	R_4	.9634	1.3055
G 2.57								.39	.67	R_3	.9357	1.2709
H 2.18									.29	R_2	.8914	1.2185
I 1.90										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 48

Significance of differences between means :

Attitude Tests. Social Adjustment. Age 8+.

Means	A : E_3	B : D	C : B	D : E_1	E : A_1	F : A_2	G : E_2	H : E_4	I : C
A 2.66		.20	.20	.62	.69	.82	.91	.97	1.82
B 2.46			.01	.43	.49	.63	.72	.77	1.63
C 2.45				.42	.49	.62	.71	.76	1.62
D 2.03					.07	.19	.29	.34	1.20
E 1.97						.13	.22	.28	1.13
F 1.84							.10	.15	1.01
G 1.74								.05	.91
H 1.69									.86
I 0.83									

Shortest Significant Ranges	5%	1%
R_9	1.1182	1.5175
R_8	1.1109	1.5060
R_7	1.1017	1.4925
R_6	1.0899	1.4757
R_5	1.0744	1.4546
R_4	1.0530	1.4270
R_3	1.0227	1.3891
R_2	.9743	1.3318

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 49

Significance of differences between means :

Attitude Tests. Self Image. Age 8+.

Means	A : C	B : A_2	C : D	D : B	E : A_1	F : E_1	G : E_2	H : E_3	I : E_4	Shortest Significant Ranges	5%	1%
A 10.33		.43	.66	1.15	1.44	2.91	3.40	3.95	4.71	R_9	2.3958	3.2513
B 9.90			.23	.72	1.01	2.48	2.97	3.52	4.28	R_8	2.3803	3.2266
C 9.68				.49	.78	2.26	2.74	3.30	4.06	R_7	2.3602	3.1977
D 9.18					.29	1.76	2.25	2.80	3.56	R_6	2.3352	3.1617
E 8.90						1.48	1.96	2.52	3.28	R_5	2.3020	3.1166
F 7.42							.48	1.04	1.80	R_4	2.2562	3.0574
G 6.94								.56	1.31	R_3	2.1913	2.9762
H 6.38									.76	R_2	2.0876	2.8535
I 5.62										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 50 a. Analysis of Variance Summaries Attitude tests. Age 9+

Test	Source	SS	df.	MS	F	Sig.
To School	Between classes	104.4925	8	13.0616	4.4862	1%
	Within classes	655.0802	225	2.9115		
	Total	759.5726	233			
Interest in School	Between classes	68.4874	8	8.5609	3.8252	1%
	Within classes	503.5511	225	2.2380		
	Total	572.0385	233			
Importance of Doing Well	Between classes	62.8990	8	7.8624	1.6738	None
	Within classes	1056.8660	225	4.6972		
	Total	1119.7650	233			
To Class	Between classes	207.9962	8	25.9995	1.4716	None
	Within classes	3975.1149	225	17.6672		
	Total	4183.1111	233			
'Other Image'	Between classes	34.6450	8	4.3306	2.7120	1%
	Within classes	359.2866	225	1.5968		
	Total	393.9316	233			
Conforming	Between classes	61.3883	8	7.6735	4.5145	1%
	Within classes	382.4408	225	1.6997		
	Total	443.8291	233			

Table 50 b — Analysis of Variance Summaries — Attitude tests. — Age 9+

Test	Source	SS	df.	MS	F	Sig.
Relationship With Teacher	Between classes	26.4762	8	3.3095	1.9163	None
	Within classes	388.5836	225	1.7270		
	Total	415.0598	233			
Anxiety in Class	Between classes	41.3430	8	5.1679	2.4482	5%
	Within classes	474.9476	225	2.1109		
	Total	516.2906	233			
Social Adjustment	Between classes	11.4687	8	1.4336	.9287	None
	Within classes	347.3219	225	1.5437		
	Total	358.7906	233			
Self Image	Between classes	78.8958	8	9.8620	1.2560	None
	Within classes	1766.6769	225	7.8519		
	Total	1845.5726	233			

Table 51

Significance of differences between means :

Attitude Tests. Attitude to School. Age 9+.

Means	A : C	B : A_1	C : E_1	D : E_3	E : B	F : A_2	G : E_2	H : E_4	I : D
A. 4.50		.60	.95	.98	1.59	1.76	2.08	2.16	2.33
B 3.90			.35	.38	.99	1.15	1.48	1.55	1.73
C 3.55				.03	.64	.81	1.13	1.20	1.38
D 3.52					.61	.78	1.10	1.17	1.35
E 2.91						.17	.49	.56	.74
F 2.74							.32	.40	.58
G 2.42								.07	.25
H 2.34									.18
I 2.17									

Shortest Significant Ranges	5%	1%
R_9	1.3453	1.8257
R_8	1.3366	1.8118
R_7	1.3255	1.7956
R_6	1.3113	1.7754
R_5	1.2926	1.7501
R_4	1.2669	1.7168
R_3	1.2305	1.6713
R_2	1.1723	1.6023

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 52

Significance of differences between means :

Attitude Tests. Interest in School. Age 9+.

Means	A : C	B : A_1	C : E_3	D : E_1	E : E_4	F : B	G : A_2	H : E_2	I : D
A 3.50		.05	.22	.44	.67	.68	.95	1.44	1.55
B 3.45			.17	.38	.62	.63	.90	1.38	1.50
C 3.28				.21	.45	.46	.73	1.21	1.33
D 3.06					.24	.25	.52	1.00	1.12
E 2.83						.01	.28	.76	.88
F 2.82							.27	.75	.87
G 2.55								.48	.60
H 2.06									.19
I 1.95									

Shortest Significant Ranges	5%	1%
R_9	1.1795	1.6007
R_8	1.1719	1.5885
R_7	1.1621	1.5743
R_6	1.1496	1.5566
R_5	1.1333	1.5344
R_4	1.1107	1.5052
R_3	1.0788	1.4653
R_2	1.0278	1.4048

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 53

Significance of differences between means :

Attitude Tests. Other Image. Age 9+.

Means	A : C	B : E_3	C : E_4	D : E_1	E : B	F : E_2	G : A_1	H : D	I : A_2	Shortest Significant Ranges	5%	1%
A 4.33		1.06	1.16	1.17	1.24	1.53	1.68	1.68	1.98	R_9	.9963	1.3521
B 3.28			.10	.11	.19	.47	.62	.63	.92	R_8	.9899	1.3418
C 3.17				.01	.08	.37	.52	.52	.82	R_7	.9816	1.3298
D 3.16					.07	.35	.50	.51	.81	R_6	.9711	1.3148
E 3.09						.28	.44	.44	.74	R_5	.9573	1.2960
F 2.81							.15	.16	.45	R_4	.9382	1.2714
G 2.66								.01	.30	R_3	.9113	1.2377
H 2.65									.29	R_2	.8681	1.1866
I 2.35										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 54

Significance of differences between means :

Attitude Tests. Conforming. Age 9+.

Means	A : E_3	B : E_1	C : E_2	D : C	E : B	F : A_1	G : E_4	H : D	I : A_2
A 3.24		.27	.56	.57	.61	1.14	1.28	1.35	1.43
B 2.97			.29	.30	.33	.86	1.00	1.08	1.16
C 2.68				.01	.04	.57	.71	.79	.87
D 2.67					.03	.56	.70	.77	.86
E 2.64						.53	.67	.74	.83
F 2.10							.14	.21	.30
G 1.97								.07	.16
H 1.89									.09
I 1.81									

Shortest Significant Ranges	5%	1%
R_9	1.0279	1.3949
R_8	1.0212	1.3844
R_7	1.0128	1.3720
R_6	1.0019	1.3565
R_5	.9877	1.3372
R_4	.9680	1.3117
R_3	.9402	1.2769
R_2	.8957	1.2243

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 55

Significance of differences between means :

Attitude Tests. Anxiety in Class. Age 9+.

Means	A : C	B : E_2	C : A_1	D : B	E : E_4	F : E_3	G : A_1	H : E_1	I : D
A 3.50		.21	.22	.32	.40	.43	.53	.89	1.42
B 3.29			.01	.11	.19	.22	.32	.68	1.21
C 3.28				.09	.17	.21	.31	.66	1.19
D 3.18					.08	.11	.21	.57	1.10
E 3.10						.03	.14	.49	1.02
F 3.07							.10	.46	.99
G 2.97								.35	.89
H 2.61									.53
I 2.08									

Shortest Significant Ranges	5%	1%
R_9	1.1455	1.5546
R_8	1.1381	1.5428
R_7	1.1287	1.5289
R_6	1.1165	1.5117
R_5	1.1007	1.4901
R_4	1.0787	1.4618
R_3	1.0477	1.4230
R_2	.9982	1.3644

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 56 — Analysis of Variance Summaries — Attitude tests. — Age 10+

Test	Source	SS	df.	MS	F	Sig.
To School	Between classes	60.9784	8	7.6223	2.5052	5%
	Within classes	684.5814	225	3.0426		
	Total	745.5598	233			
Interest in School	Between classes	43.0142	8	5.3768	2.4487	5%
	Within classes	494.0456	225	2.1958		
	Total	537.0598	233			
Importance of Doing Well	Between classes	49.7714	8	6.2214	1.4116	None
	Within classes	991.6858	225	4.4075		
	Total	1041.4573	233			
To Class	Between classes	491.8451	8	61.4806	4.3117	1%
	Within classes	3208.2788	225	14.2590		
	Total	3700.1239	233			
'Other Image'	Between classes	44.6174	8	5.5772	3.4384	1%
	Within classes	364.9552	225	1.6220		
	Total	409.5276	233			
Conforming	Between classes	64.1062	8	8.0133	4.9463	1%
	Within classes	364.5092	225	1.6200		
	Total	428.6154	233			

Table 56 b — Analysis of Variance Summaries — Attitude tests. — Age 10+

Test	Source	SS	df.	MS	F	Sig.
Relationship With Teacher	Between classes	21.4997	8	2.6875	1.5700	None
	Within classes	385.1542	225	1.7118		
	Total	406.6538	233			
Anxiety in Class	Between classes	68.0024	8	8.5003	3.7915	1%
	Within classes	504.4421	225	2.2420		
	Total	572.4444	233			
Social Adjustment	Between classes	11.1733	8	1.3967	1.1172	None
	Within classes	281.2882	225	1.2502		
	Total	292.4615	233			
Self Image	Between classes	93.1527	8	11.6441	1.1926	None
	Within classes	2196.8857	225	9.7639		
	Total	2290.0385	233			

Table 57

Significance of differences between means :

Attitude Tests. Attitude to School. Age 10+.

Means	A : C	B : B	C : E_3	D : A_1	E : E_1	F : E_2	G : A_2	H : E_4	I : D
A 4.67		.58	.81	.84	.99	1.57	1.60	1.70	2.02
B 4.09			.23	.26	.41	.99	1.02	1.12	1.44
C 3.86				.03	.18	.76	.79	.89	1.21
D 3.83					.15	.73	.76	.86	1.18
E 3.68						.58	.61	.71	1.03
F 3.10							.03	.13	.45
G 3.07								.10	.42
H 2.97									.32
I 2.65									

Shortest Significant Ranges	5%	1%
R_9	1.3753	1.8664
R_8	1.3664	1.8522
R_7	1.3550	1.8356
R_6	1.3405	1.8149
R_5	1.3214	1.7890
R_4	1.2951	1.7550
R_3	1.2579	1.7085
R_2	1.1984	1.6380

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 58

Significance of differences between means :

Attitude Tests. Interest in School. Age 10+.

Means	A : C	B : E_3	C : B	D : E_1	E : E_2	F : E_4	G : A_1	H : A_2	I : D	Shortest Significant Ranges	5%	1%
A 3.67		.32	.67	.77	.96	.98	1.01	1.09	1.75	R_9	1.1683	1.5855
B 3.35			.35	.45	.64	.66	.69	.77	1.43	R_8	1.1608	1.5735
C 3.00				.10	.29	.31	.34	.42	1.08	R_7	1.1511	1.5594
D 2.90					.19	.21	.24	.32	.98	R_6	1.1387	1.5418
E 2.71						.02	.05	.13	.79	R_5	1.1226	1.5198
F 2.69							.03	.11	.77	R_4	1.1002	1.4909
G 2.66								.08	.74	R_3	1.0686	1.4514
H 2.58									.66	R_2	1.0180	1.3915
I 1.92										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 59

Significance of differences between means :

Attitude Tests. Attitude to Class. Age 10+.

Means	A : C	B : E_3	C : E_2	D : A_1	E : A_2	F : B	G : E_4	H : E_1	I : D
A 12.67		.12	1.35	1.43	1.44	1.58	1.67	3.38	4.70
B 12.55			1.23	1.31	1.32	1.46	1.55	3.26	4.58
C 11.32				.08	.09	.23	.32	2.03	3.35
D 11.24					.01	.15	.24	1.95	3.27
E 11.23						.14	.23	1.94	3.26
F 11.09							.09	1.80	3.12
G 11.00								1.71	3.03
H 9.29									1.32
I 7.97									

Shortest Significant Ranges	5%	1%
R_9	2.9772	4.0403
R_8	2.9579	4.0097
R_7	2.9334	3.9737
R_6	2.9019	3.9290
R_5	2.8607	3.8729
R_4	2.8037	3.7993
R_3	2.7231	3.6985
R_2	2.5942	3.5460

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 60

Significance of differences between means :

Attitude Tests. Other Image. Age 10+.

Means	A : C	B : B	C : E_3	D : E_4	E : E_1	F : E_2	G : D	H : A_1	I : A_2	Shortest Significant Ranges	5%	1%
A 3.83		.10	.55	.55	.57	.70	1.23	1.35	1.51	R_9	1.0041	1.3627
B 3.73			.45	.45	.47	.60	1.13	1.25	1.41	R_8	.9976	1.3523
C 3.28				.0	.02	.15	.68	.80	.96	R_7	.9894	1.3402
D 3.28					.02	.15	.68	.80	.96	R_6	.9787	1.3252
E 3.26						.13	.66	.78	.94	R_5	.9648	1.3062
F 3.13							.53	.65	.81	R_4	.9456	1.2814
G 2.60								.12	.28	R_3	.9184	1.2474
H 2.48									.16	R_2	.8750	1.1960
I 2.32										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 61

Significance of differences between means :

Attitude Tests. Conforming. Age 10+.

Means	A : E_1	B : E_3	C : B	D : C	E : E_2	F : D	G : A_1	H : E_4	I : A_2	Shortest Significant Ranges	5%	1%
A 3.23		.40	.41	.90	1.10	1.23	1.26	1.44	1.55	R_9	1.0035	1.3619
B 2.83			.01	.50	.70	.83	.86	1.04	1.15	R_8	.9970	1.3515
C 2.82				.49	.69	.82	.85	1.03	1.14	R_7	.9887	1.3394
D 2.33					.20	.33	.36	.54	.65	R_6	.9781	1.3243
E 2.13						.13	.16	.34	.45	R_5	.9642	1.3054
F 2.00							.03	.21	.32	R_4	.9450	1.2806
G 1.97								.18	.29	R_3	.9178	1.2466
H 1.79									.11	R_2	.8744	1.1952
I 1.68										df = 18.5634		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 62

Significance of differences between means :

Attitude Tests. Anxiety in Class. Age 10+.

Means	A : E_2	B : B	C : C	D : E_3	E : A_1	F : A_2	G : E_4	H : E_1	I : D
A 3.61		.15	.44	.51	.75	.84	.95	1.09	1.80
B 3.46			.29	.36	.60	.69	.80	.94	1.65
C 3.17				.07	.31	.40	.51	.65	1.36
D 3.10					.24	.33	.44	.58	1.29
E 2.86						.09	.20	.34	1.05
F 2.77							.11	.25	.96
G 2.66								.14	.85
H 2.52									.71
I 1.81									

Shortest Significant Ranges	5%	1%
R_9	1.1806	1.6021
R_8	1.1729	1.5899
R_7	1.1632	1.5757
R_6	1.1507	1.5580
R_5	1.1343	1.5357
R_4	1.1117	1.5065
R_3	1.0798	1.4666
R_2	1.0287	1.4061

df = 18.5634

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Table 65

Analysis of Variance

of Extraversion scores of low attaining extraverts at 8+, 9+ and 10+.

Test	Source	SS	df.	MS	F	Sig.
Extraversion	Between classes	48	2	24.3141	3.0946	None
	Within classes	1202.1154	153	7.8570		
	Total	1250.7436	155			

Analysis of Variance

of Extraversion scores of high attaining extraverts at 8+, 9+ and 10+.

Extraversion	Between classes	40.6263	2	20.3131	3.3082	5%
	Within classes	589.4545	96	6.1402		
	Total	630.0808	98			

Analysis of Variance

of Neuroticism scores of low attaining stable pupils at 8+, 9+ and 10+.

Neuroticism	Between classes	356.3111	2	178.1556	9.9558	1%
	Within classes	3167.3500	177	17.8946		
	Total	3523.6611	179			

Table 65b

Analysis of Variance

of Neuroticism scores of high attaining stable pupils at 8+, 9+ and 10+.

Test	Source	SS	df.	MS	F	Sig.
Neuroticism	Between classes	181.6092	2	90.8046	4.2333	5%
	Within classes	1801.7931	84	21.4499		
	Total	1983.4023	86			

Table Analysis of Variance. Extraversion groups 'E' scores.

Age	Source	SS	df.	MS	F
8+	Between classes	2460.7581	2	1230.3790	449.6882
	Within classes	632.0325	231	2.7361	
	Total	3092.7906	233		
9+	Between classes	516.4886	2	258.2443	23.3998
	Within classes	2549.3576	231	11.0362	
	Total	3065.8462	233		
10+	Between classes	449.7026	2	224.8513	17.8558
	Within classes	2908.8957	231	12.5926	
	Total	3358.5983	233		

Table Analysis of Variance. Neuroticism groups 'N' scores.

Age	Source	SS	df.	MS	F
8+	Between classes	4302.6709	2	2151.3354	12944.25
	Within classes	38.3931	231	.1662	
	Total	4264.2778	233		
9+	Between classes	1751.2804	2	875.6402	48.9329
	Within classes	4133.6812	231	17.8947	
	Total	5884.9615	233		
10+	Between classes	4973.9938	2	486.99	630.6440
	Within classes	910.9677	231	3.9436	
	Total	5884.9615	233		

Table Analysis of Variance. Neuroticism scores at 8+, 9+ and 10+.

Source	SS	df.	MS	F
Between classes	210.2593	2	105.1296	8.0482
Within classes	9130.7094	699	13.0825	
Total	9340.9687	701		

Analysis of Variance. Extraversion scores at 8+, 9+ and 10+.

Between classes	3.2507	2	1.6254	.0662
Within classes	17154.6068	699	24.5416	
Total	17157.8576	701		

Means of personality groups

Attainment Tests : spelling

Group		Boys			Girls			Total		
Extraversion		Low	Average	High	Low	Average	High	Low	Average	High
Neuroticism										
	High	52.00	45.75	47.52	48.56	51.07	51.00	50.45	49.22	48.56
Age 8+	Average	45.11	46.38	50.42	46.07	46.31	48.77	45.71	46.35	49.56
	Low	44.64	46.95	48.91	48.54	48.83	51.60	46.75	47.66	49.73
	High	43.62	46.50	49.00	43.87	44.36	49.00	43.75	45.25	49.00
Age 9+	Average	47.33	45.16	50.07	43.88	47.00	51.31	46.27	45.83	50.73
	Low	37.50	51.88	45.43	41.79	46.73	51.50	40.00	48.90	47.54
	High	45.00	45.79	41.14	42.00	45.57	44.44	43.92	45.68	43.00
Age 10+	Average	42.42	46.42	43.6	42.33	44.55	50.82	42.37	45.52	46.34
	Low	40.73	42.67	46.00	43.46	48.39	48.18	42.09	46.05	46.77

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Spelling. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	9.4903	9.4903	1.4870	-
Extraversion	2	19.1229	9.5614	1.4981	-
Neuroticism	2	12.7953	6.3976	1.0024	-
Sex x Extraversion	2	2.7237	1.3618	.2134	-
Sex x Neuroticism	2	8.2946	4.1473	.6498	-
Extraversion x Neuroticism	4	17.2525	4.3131	.6758	-
Sex x Extraversion x Neuroticism	4	20.0033	5.0008	.7835	-
Error	216	16456.9041	6.3823		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Spelling. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.4835	.4835	.0679	-
Extraversion	2	124.5986	62.2993	8.7551	1%
Neuroticism	2	9.5154	4.7577	.6686	-
Sex x Extraversion	2	13.5710	6.7855	.9536	-
Sex x Neuroticism	2	4.6587	2.3294	.3274	-
Extraversion x Neuroticism	4	50.2999	12.5750	1.7672	-
Sex x Extraversion x Neuroticism	4	30.7825	7.6956	1.0815	-
Error	216	18308.3487	7.1158		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attainment Tests. Age 9+.

Spelling

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 49.08		2.64	5.64	R_3	.8995	1.1660
B 46.44			3.00	R_2	.8550	1.1370
C 43.44				df =	77.76	

Reading

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 51.51		.73	4.47	R_3	.9404	1.2192
B 50.78			3.74	R_2	.8940	1.8888
C 47.04				df =	77.76	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

69/75

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Spelling. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	14.1689	14.1689	2.6936	-
Extraversion	2	35.4347	17.7173	3.3682	5%
Neuroticism	2	3.8380	1.9190	.3648	-
Sex x Extraversion	2	14.9305	7.4652	1.4192	-
Sex x Neuroticism	2	9.2762	4.6381	.8817	-
Extraversion x Neuroticism	4	5.6023	1.4006	.2663	-
Sex x Extraversion x Neuroticism	4	39.1566	9.7892	1.8610	-
Error	216	13646.2955	5.2602		

Harmonic Mean Group n = 12.0104

Significance of differences between means :

Attainment Tests. Age 10+.

Spelling

Means	A : HE	B : ME	C : LE
A 45.82		.08	2.88
B 45.74			2.80
C 42.94			

Shortest Significant Ranges

	5%	1%
R_3	.7749	1.0046
R_2	.7367	.9796

df = 77.88

Reading

Means	A : HE	B : ME	C : LE
A 54.10		.83	5.04
B 54.27			4.21
C 49.06			

Shortest Significant Ranges

	5%	1%
R_3	.8463	1.0971
R_2	.8045	1.0698

df = 77.88

Number

Means	A : HE	B : ME	C : LE
A 39.03		.22	2.68
B 38.81			2.45
C 36.35			

Shortest Significant Ranges

	5%	1%
R_3	.6657	.8630
R_2	.6328	.8415

df = 77.88

Comp/Vocab.

Means	A : HE	B : ME	C : LE
A 51.09		1.90	4.51
B 49.19			2.61
C 46.58			

Shortest Significant Ranges

	5%	1%
R_3	.7956	1.0314
R_2	.7263	1.0057

df = 77.88

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

71/78/86/93

Means of personality groups

Attainment Tests : reading.

Group		Boys			Girls			Total		
Extraversion		Low	Average	High	Low	Average	High	Low	Average	High
Neuroticism										
	High	52.27	48.38	48.05	48.00	44.13	50.13	50.35	45.61	48.67
Age 8+	Average	49.33	47.77	48.92	47.87	44.62	48.77	48.42	46.19	48.84
	Low	44.73	48.35	48.70	44.08	46.33	49.80	44.38	47.59	49.03
	High	50.00	49.70	54.39	45.33	48.79	50.86	47.50	49.17	53.15
Age 9+	Average	52.00	49.21	50.71	45.50	49.46	52.63	50.0	49.3	49.69
	Low	41.20	59.63	48.57	44.79	51.91	53.33	43.29	55.16	50.30
	High	51.70	55.71	46.14	46.69	50.86	52.56	49.89	53.29	49.75
Age 10+	Average	49.58	57.92	53.39	46.47	51.00	57.82	47.86	54.61	55.07
	Low	48.18	51.00	53.40	50.18	52.46	51.27	49.18	51.86	52.65

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Reading. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	9.0596	9.0596	1.1688	-
Extraversion	2	18.2823	9.1412	1.1793	-
Neuroticism	2	6.7771	3.3885	.4372	-
Sex x Extraversion	2	14.0440	7.0220	.9059	-
Sex x Neuroticism	2	2.0397	1.0199	.1316	-
Extraversion x Neuroticism	4	30.2420	7.5605	.9754	-
Sex x Extraversion x Neuroticism	4	2.4029	.6007	.0775	-
Error	216	19986.7460	7.7513		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Reading. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	9.1165	9.1165	1.1768	-
Extraversion	2	105.5004	52.7502	6.8092	1%
Neuroticism	2	.0183	.0092	.0012	-
Sex x Extraversion	2	13.8174	6.9087	.8918	-
Sex x Neuroticism	2	7.9065	3.9533	.5103	-
Extraversion x Neuroticism	4	96.2051	24.0513	3.1046	5%
Sex x Extraversion x Neuroticism	4	55.1282	13.7820	1.7790	-
Error	216	19934.7676	7.7469		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attainment Tests. Age 9+.

Reading Means	A : LN ME	B : HN HE	C : LN HE	D : MN LE	E : MN ME	F : MN HE	G : HN ME	H : HN LE	I : LN LE
A 55.16		2.01	4.86	5.16	5.47	5.86	5.99	7.66	11.87
B 53.15			2.85	3.15	3.46	3.85	3.98	5.65	9.81
C 50.30				.30	.61	1.00	1.13	2.80	7.01
D 50.00					.31	.70	.83	2.50	6.71
E 49.69						.39	.52	2.19	6.40
F 49.30							.13	1.80	6.01
G 49.17								1.67	5.88
H 47.50									4.21
I 43.29									

Shortest Significant Ranges	5%	1%
R_9	1.8717	2.5082
R_8	1.8578	2.4882
R_7	1.8412	2.4643
R_6	1.8195	2.4360
R_5	1.7917	2.4005
R_4	1.7551	2.3544
R_3	1.7029	2.2916
R_2	1.6212	2.1972
df =		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

(75 with 69)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Reading. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	3.3025	3.3025	.5264	-
Extraversion	2	65.4049	32.7024	5.2130	1%
Neuroticism	2	14.3697	7.1849	1.1453	-
Sex x Extraversion	2	32.3095	16.1548	2.5752	-
Sex x Neuroticism	2	4.1913	2.0957	.3341	-
Extraversion x Neuroticism	4	34.0855	8.5214	1.3584	-
Sex x Extraversion x Neuroticism	4	48.8960	12.2240	1.9486	-
Error	216	16274.2557	6.2732		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attainment Tests : number

Group		Boys			Girls			Total		
Extraversion		Low	Average	High	Low	Average	High	Low	Average	High
Neuroticism										
	High	42.36	42.63	45.05	41.11	42.53	42.75	41.80	42.57	44.37
Age 8+	Average	41.33	42.00	45.00	40.53	38.85	43.46	40.83	40.42	44.20
	Low	41.09	44.20	43.78	40.39	41.67	44.10	40.71	43.25	43.88
	High	37.78	37.90	42.46	34.00	40.43	39.14	35.75	39.38	41.30
Age 9+	Average	41.39	39.47	41.71	37.75	37.73	43.25	40.27	38.83	42.53
	Low	38.30	46.50	41.95	37.71	43.46	43.50	37.96	44.74	42.52
	High	37.35	38.00	36.86	37.00	37.07	37.78	37.22	37.54	37.38
Age 10+	Average	35.42	38.08	38.78	36.73	39.91	43.18	36.15	38.96	40.45
	Low	35.55	37.11	38.35	34.82	42.46	38.91	35.18	40.27	38.55

(78 with 71)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Number. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	8.7501	8.7501	2.8335	-
Extraversion	2	26.8905	13.4453	4.3539	1%
Neuroticism	2	3.0784	1.5392	.4984	-
Sex x Extraversion	2	1.1484	.5742	.1859	-
Sex x Neuroticism	2	.8616	.4308	.1395	-
Extraversion x Neuroticism	4	7.1859	1.7965	.5817	-
Sex x Extraversion x Neuroticism	4	43.3996	10.8499	3.5134	1%
Error	216	7962.8122	3.0881		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attainment Tests. Age 8+.

Number.

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A 44.13		1.98	3.06	R_3	.5480	.7105
B 42.15			1.08	R_2	.5210	.6928
C 41.07				df = 76.92		

Comp/Vocab.

Means	A : B MN	B : G HN	C : G LN	D : B HN	E : G MN	F : B LN	Shortest Significant Ranges	5%	1%
A 50.85		2.51	2.71	2.95	5.24	5.59	R_6	.9504	1.2511
B 48.34			.20	.44	2.73	3.08	R_5	.9348	1.2322
C 48.14				.24	2.53	2.88	R_4	.9145	1.2081
D 47.90					2.29	2.64	R_3	.8862	1.1756
E 45.61						.35	R_2	.8425	1.1276
F 45.26							df = 38.58		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Number. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	6.1133	6.1133	1.3221	-
Extraversion	2	56.4439	28.2220	6.1035	1%
Neuroticism	2	32.3815	16.1907	3.5015	5%
Sex x Extraversion	2	5.4326	2.7163	.5874	-
Sex x Neuroticism	2	.5461	.2731	.0591	-
Extraversion x Neuroticism	4	35.5457	8.8864	1.9218	-
Sex x Extraversion x Neuroticism	4	18.9090	4.7273	1.0224	-
Error	216	11896.9146	4.6239		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attainment Tests. Age 9+.

Number				Shortest Significant Ranges		
Means	A : LN	B : MN	C : HN		5%	1%
A	41.63	1.07	3.13	R_3	.6700	.8686
B	40.56		2.06	R_2	.6369	.8469
C	38.50			df = 77.78		

Number				Shortest Significant Ranges		
Means	A : HE	B : ME	C : LE		5%	1%
A	42.23	1.68	4.29	R_3	1.2132	1.6326
B	40.55		2.61	R_2	1.1550	1.5654
C	37.94			df = 77.76		

Comp/Vocab.				Shortest Significant Ranges		
Means	A : HE	B : ME	C : LE		5%	1%
A	48.98	1.75	4.81	R_3	.6374	.8263
B	47.23		3.06	R_2	.6059	.8058
C	44.17			df = 77.76		

Verbal Reasoning				Shortest Significant Ranges		
Means	A : HE	B : ME	C : LE		5%	1%
A	47.57	1.53	4.29	R_3	.8074	1.0467
B	46.04		2.76	R_2	.7676	1.0207
C	43.28			df = 77.76		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

83/84/91/97

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Number. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	8.4872	8.4872	2.1863	-
Extraversion	2	29.9195	14.9597	3.8536	5%
Neuroticism	2	5.4728	2.7364	.7049	-
Sex x Extraversion	2	3.7944	1.8972	.4887	-
Sex x Neuroticism	2	5.4817	2.7409	.7060	-
Extraversion x Neuroticism	4	17.4702	4.3676	1.1251	-
Sex x Extraversion x Neuroticism	4	9.5329	2.3832	.6139	-
Error	216	10070.9243	3.8820		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attainment Tests : Comp/Vocab.

	Group	Boys			Girls			Total		
	Extroversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	45.64	50.38	48.16	46.22	49.47	48.63	45.90	49.78	48.30
Age 8+	Average	50.33	48.15	54.17	46.47	43.92	46.31	47.92	46.04	50.08
	Low	37.91	47.35	46.96	48.62	46.00	50.10	43.71	46.84	47.91
	High	43.54	45.60	51.54	42.80	47.14	48.43	43.14	46.50	50.45
Age 9+	Average	47.61	45.68	47.00	43.13	45.00	50.69	46.23	45.43	48.97
	Low	41.40	51.63	46.52	44.36	50.55	50.83	43.13	51.00	48.09
	High	51.17	50.50	47.43	46.31	48.29	47.56	49.42	49.39	47.50
Age 10+	Average	47.00	49.00	51.00	43.40	51.18	56.00	45.00	50.04	51.07
	Low	44.73	46.33	52.00	43.00	49.23	49.91	43.86	48.05	51.26

(86 with 71)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Comp/Vocab. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.6087	.6087	.1102	-
Extraversion	2	30.5572	15.2786	2.7656	-
Neuroticism	2	16.0202	8.0101	1.4499	-
Sex x Extraversion	2	18.6226	9.3113	1.6854	-
Sex x Neuroticism	2	67.8367	33.9183	6.1395	1%
Extraversion x Neuroticism	4	31.9944	7.9986	1.4478	-
Sex x Extraversion x Neuroticism	4	21.7020	5.4255	.9821	-
Error	216	14245.2878	5.5246		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Comp/Vocab. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.3227	.3227	.0691	-
Extraversion	2	91.1930	45.5965	9.7679	1%
Neuroticism	2	4.2852	2.1426	.4590	-
Sex x Extraversion	2	4.5220	2.2610	.4844	-
Sex x Neuroticism	2	7.3128	3.6564	.7833	-
Extraversion x Neuroticism	4	42.7619	10.6905	2.2902	-
Sex x Extraversion x Neuroticism	4	24.5729	6.1432	1.3160	-
Error	216	12010.5070	4.6680		

Harmonic Mean Group n = 11.9117

(89 with 81)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Comp/Vocab. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.0177	1.0177	.1652	-
Extraversion	2	69.2271	34.6135	5.6183	1%
Neuroticism	2	12.7739	6.3870	1.0367	-
Sex x Extraversion	2	19.2014	9.6007	1.5583	-
Sex x Neuroticism	2	9.2867	4.6434	.7537	-
Extraversion x Neuroticism	4	54.5697	13.6424	2.2144	-
Sex x Extraversion x Neuroticism	4	13.4468	3.3617	.5457	-
Error	216	15983.0022	6.1609		

Harmonic Mean Group n = 12.0104

(91 with 83)

Means of personality groups

Attainment Tests : verbal reasoning

	Group	Boys			Girls			Total		
	Neuroticism	Low	Average	High	Low	Average	High	Low	Average	High
	High	44.18	43.63	45.53	39.00	46.13	43.63	41.85	45.26	44.96
Age 8+	Average	42.44	44.85	45.92	42.00	43.39	42.31	42.17	44.12	44.04
	Low	36.91	42.85	46.74	46.62	39.33	46.30	42.17	41.53	46.61
	High	41.15	45.90	49.08	41.93	44.71	44.86	41.57	45.21	47.60
Age 9+	Average	44.89	45.26	47.50	45.13	45.91	47.25	44.96	45.5	47.37
	Low	42.40	52.13	46.43	44.21	44.91	50.00	43.46	47.98	47.73
	High	42.74	42.79	41.43	39.54	42.36	42.00	41.58	42.57	41.75
Age 10+	Average	38.25	43.25	45.39	38.47	43.27	48.36	38.37	43.26	46.52
	Low	40.91	41.22	46.35	38.82	42.15	44.91	39.86	41.77	45.84

(93 with 71) 94

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Verbal Reasoning. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.0464	1.0464	.1591	-
Extraversion	2	31.0179	15.5089	2.3579	-
Neuroticism	2	.9613	.4807	.0731	-
Sex x Extraversion	2	8.6671	4.3335	.6588	-
Sex x Neuroticism	2	39.7181	19.8590	3.0192	-
Extraversion x Neuroticism	4	22.0527	5.5132	.8382	-
Sex x Extraversion x Neuroticism	4	28.0346	7.0087	1.0656	-
Error	216	16960.2714	6.5775		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Verbal Reasoning. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.8883	1.8883	.3088	-
Extraversion	2	58.3639	29.1820	4.7722	1%
Neuroticism	2	13.3999	6.7000	1.0957	-
Sex x Extraversion	2	9.6178	4.8089	.7864	-
Sex x Neuroticism	2	2.3171	1.1585	.1895	-
Extraversion x Neuroticism	4	12.9412	3.2353	.5291	-
Sex x Extraversion x Neuroticism	4	30.1550	7.5388	1.2328	-
Error	216	15733.5932	6.1151		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Verbal Reasoning. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.3335	.3335	.0621	-
Extraversion	2	73.7922	36.8961	6.8686	1%
Neuroticism	2	3.1524	1.5762	.2934	-
Sex x Extraversion	2	4.7307	2.3654	.4403	-
Sex x Neuroticism	2	4.0711	2.0356	.3789	-
Extraversion x Neuroticism	4	36.0901	9.0225	1.6796	-
Sex x Extraversion x Neuroticism	4	3.8452	.9613	.1790	-
Error	216	13935.4421	5.3717		

Harmonic Mean Group n = 12.0104

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Significance of differences between means :

Attainment Tests. Age 10+.

Verbal Reasoning

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A 45.24		2.69	5.12	R_3	.8558	1.1094
B 42.55			2.43	R_2	.8135	1.0818
				df = 77.88		

Numerical Problem Solving

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A 44.00		1.67	3.58	R_3	.6556	.8499
B 42.33			1.91	R_2	.6232	.8288
C 40.42				df = 77.88		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means of personality groups

Attainment Tests : Numerical Problem Solving

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	48.82	46.63	50.21	49.22	46.80	49.38	49.00	46.74	49.96
Age 8+	Average	48.44	50.15	50.83	44.60	45.46	52.15	46.04	47.81	51.52
	Low	46.91	49.70	50.78	47.77	47.25	51.00	47.38	48.78	50.85
	High	39.31	42.10	45.15	37.87	40.14	39.43	38.54	40.96	43.15
Age 9+	Average	42.89	41.79	45.79	39.25	40.64	43.19	41.77	41.37	44.40
	Low	40.00	48.13	44.43	38.93	45.27	43.67	39.38	46.47	44.01
	High	43.22	42.36	40.43	38.46	40.36	42.78	41.50	41.36	41.75
Age 10+	Average	40.50	42.67	44.56	38.07	43.18	46.82	39.15	42.91	45.41
	Low	42.00	42.33	44.40	38.46	43.39	42.82	40.23	42.96	43.84

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Numerical Problem Solving. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.3414	4.3414	.8064	-
Extraversion	2	37.9295	18.9647	3.5226	5%
Neuroticism	2	.5009	.2504	.0465	-
Sex x Extraversion	2	4.9488	2.4744	.4596	-
Sex x Neuroticism	2	4.6467	2.3233	.4315	-
Extraversion x Neuroticism	4	12.1068	3.0267	.5622	-
Sex x Extraversion x Neuroticism	4	10.0758	2.5189	.4679	-
Error	216	13882.1839	5.3838		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attainment Tests. Age 8+.

Numerical Problem Solving

Means	A : HE	B : ME	C : LE
A 50.77		2.88	3.39
B 47.89			.51
C 47.38			

Shortest Significant Ranges

	5%	1%
R_3	.7829	1.0149
R_2	.7442	.9896

df = 76.92

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Numerical Problem Solving. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratios	Significance
Sex	1	24.9689	24.9689	6.6919	1%
Extraversion	2	52.9860	26.4930	7.1004	1%
Neuroticism	2	22.6934	11.3467	3.0410	5%
Sex x Extraversion	2	1.0161	.5080	.1362	-
Sex x Neuroticism	2	1.6615	.8308	.2227	-
Extraversion x Neuroticism	4	29.8758	7.4690	2.0018	-
Sex x Extraversion x Neuroticism	4	5.5107	1.3777	.3692	-
Error	216	9600.0941	3.7312		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attainment Tests. Age 9+.

Numerical Problem Solving

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A	44.00	1.44	4.13	R_3	.6527	.8461
B	42.56		2.69	R_2	.6204	.8250
C	39.87			df = 77.76		

Means	A : LN	B : MN	C : HN	Shortest Significant Ranges	5%	1%
A	43.22	.67	2.59	R_3	.6527	.8461
B	42.55		1.92	R_2	.6204	.8250
C	40.63			df = 77.78		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Numerical Problem Solving. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	3.6721	3.6721	.9753	-
Extraversion	2	38.1209	19.0605	5.0625	1%
Neuroticism	2	5.9089	2.9545	.7847	-
Sex x Extraversion	2	17.0777	8.5389	2.2680	-
Sex x Neuroticism	2	2.3358	1.1679	.3102	-
Extraversion x Neuroticism	4	16.3713	4.0928	1.0871	-
Sex x Extraversion x Neuroticism	4	4.1233	1.0308	.2738	-
Error	216	9767.4000	3.7650		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attainment Tests : Spatial Reasoning

	Group	Boys			Girls			Total		
	Extroversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	45.15	49.00	49.08	43.53	46.14	44.43	44.29	47.33	47.45
Age 9+	Average	48.33	45.63	46.21	40.88	45.18	51.38	46.04	45.47	48.97
	Low	43.80	54.50	46.38	46.29	44.73	47.92	45.25	48.84	46.94
	High	46.96	46.43	43.29	46.15	44.00	48.11	46.67	45.21	46.00
Age 10+	Average	43.00	47.08	48.44	41.53	46.00	52.91	42.19	46.57	50.14
	Low	44.27	40.78	46.00	39.55	47.69	52.36	41.91	44.86	48.26

(107 with 99) 108

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Spatial Reasoning. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	17.2089	17.2089	2.7047	-
Extraversion	2	33.2969	16.6485	2.6166	-
Neuroticism	2	4.2090	2.1045	.3308	-
Sex x Extraversion	2	19.2288	9.6144	1.5111	-
Sex x Neuroticism	2	3.4173	1.7087	.2686	-
Extraversion x Neuroticism	4	18.7095	4.6774	.7351	-
Sex x Extraversion x Neuroticism	4	69.2920	17.3230	2.7226	5%
Error	216	16370.7095	6.3627		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attainment Tests. Spatial Reasoning. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	8.0668	8.0668	1.5014	-
Extraversion	2	75.3194	37.6597	7.0095	1%
Neuroticism	2	5.7567	2.8784	.5357	-
Sex x Extraversion	2	42.8469	21.4235	3.9875	5%
Sex x Neuroticism	2	5.1474	2.5737	.4790	-
Extraversion x Neuroticism	4	52.3975	13.0994	2.4381	5%
Sex x Extraversion x Neuroticism	4	26.5661	6.6465	1.2371	-
Error	216	13938.1777	5.3727		

Harmonic Mean Group n = 12.0104

Significance of differences between means :

Attainment Tests. Age 10+.

Spatial Reasoning

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges 5%	1%
A 48.50		2.97	4.49	R_3 .7808	1.0122
B 45.53			1.52	R_2 .7422	.9870
C 44.01				df = 77.88	

Spatial Reasoning

Means	A : G HE	B : B HE	C : G ME	D : B LE	E : B ME	F : G LE	Shortest Significant Ranges 5%	1%
A 51.32		4.76	5.48	6.04	6.12	8.81	R_6 1.2049	1.5861
B 46.56			.72	1.28	1.36	4.05	R_5 1.1851	1.5622
C 45.84				.56	.64	3.33	R_4 1.1593	1.5315
D 45.28					.08	2.77	R_3 1.1234	1.4904
E 45.20						2.69	R_2 1.0681	1.4295
F 42.51							df = 38.94	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attainment Tests. Age 10+.

Spatial Reasoning

Means	A : MN HE	B : LN HE	C : HN LE	D : MN ME	E : HN HE	F : HN ME	G : LN ME	H : MN LE	I : LN LE
A 50.14		1.88	3.47	3.57	4.14	4.93	5.28	7.95	8.23
B 48.26			1.59	1.69	2.26	3.05	3.40	6.07	6.35
C 46.67				.10	.67	1.46	1.81	4.48	4.76
D 46.57					.57	1.36	1.71	4.38	4.66
E 46.00						.79	1.14	3.81	4.09
F 45.21							.35	3.02	3.30
G 44.86								2.67	2.95
H 42.19									.28
I 41.91									

Shortest Significant Ranges	5%	1%
R_9	1.5540	2.0824
R_8	1.5425	2.0658
R_7	1.5286	2.0460
R_6	1.5106	2.0225
R_5	1.4876	1.9930
R_4	1.4571	1.9547
R_3	1.4138	1.9026
R_2	1.3460	1.8242

df = 24.91

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means of personality groups

Attitudes to curriculum : composition

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	4.64	5.25	5.84	5.44	6.27	6.13	5.00	5.91	5.93
Age 8+	Average	5.89	4.46	4.08	5.73	5.77	4.77	5.79	5.12	4.44
	Low	5.00	4.90	4.35	6.31	6.17	5.80	5.71	5.38	4.79
	High	4.08	5.60	5.00	4.67	5.43	5.43	4.39	5.50	5.15
Age 9+	Average	5.78	5.11	4.71	4.75	5.27	5.75	5.46	5.17	5.27
	Low	3.20	5.38	3.43	4.07	4.82	5.58	3.71	5.05	4.21
	High	5.17	4.79	7.00	4.69	4.64	5.11	5.00	4.71	5.94
Age 10+	Average	5.08	4.67	4.33	5.00	4.55	5.36	5.04	4.61	4.72
	Low	4.36	5.11	4.80	4.36	5.54	5.55	4.36	5.36	5.07

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Composition. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	3.5378	3.5378	6.4914	1%
Extraversion	2	.4233	.2117	.3884	-
Neuroticism	2	.7037	.3519	.6456	-
Sex x Extraversion	2	.2401	.1201	.2203	-
Sex x Neuroticism	2	.4753	.2377	.4361	-
Extraversion x Neuroticism	4	2.8445	.7111	1.3048	-
Sex x Extraversion x Neuroticism	4	.3506	.0876	.1608	-
Error	216	1405.2407	.5450		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Composition. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.6728	.6728	1.8199	-
Extraversion	2	2.2083	1.1042	2.9867	-
Neuroticism	2	2.1761	1.0881	2.9431	-
Sex x Extraversion	2	1.5962	.7881	2.1588	-
Sex x Neuroticism	2	.4610	.2305	.6235	-
Extraversion x Neuroticism	4	1.3655	.3414	.9234	-
Sex x Extraversion x Neuroticism	4	1.3570	.3393	.9176	-
Error	216	951.3383	.3697		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Composition. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0145	.0145	.0393	-
Extraversion	2	.0807	.0403	.1097	-
Neuroticism	2	.5091	.2545	.6924	-
Sex x Extraversion	2	1.1141	.5571	1.5154	-
Sex x Neuroticism	2	1.3908	.6954	1.8918	-
Extraversion x Neuroticism	4	3.2550	.8138	2.2137	-
Sex x Extraversion x Neuroticism	4	.4032	.1008	.2742	-
Error	216	953.5278	.3676		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to curriculum : reading

Group		Boys			Girls			Total		
Extroversion / Neuroticism		Low	Average	High	Low	Average	High	Low	Average	High
	High	4.91	6.63	5.11	6.44	5.67	5.50	5.60	6.00	5.22
Age 8+	Average	3.67	6.23	6.25	5.73	5.00	5.31	4.96	5.62	5.76
	Low	4.73	5.10	4.83	5.92	5.58	4.90	5.38	5.28	4.85
	High	2.92	4.20	5.15	5.80	5.29	4.29	4.46	4.83	4.85
Age 9+	Average	4.56	4.79	4.36	4.88	4.46	5.81	4.65	4.67	5.13
	Low	4.20	5.25	3.86	5.00	5.55	5.00	4.67	5.42	4.27
	High	4.30	4.79	5.14	5.23	4.57	6.11	4.64	4.68	5.69
Age 10+	Average	5.00	4.58	5.00	5.13	4.46	6.27	5.07	4.52	5.48
	Low	5.18	4.33	4.10	4.73	5.39	5.18	4.96	4.96	4.48

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Reading. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.3727	.3727	1.0174	-
Extraversion	2	.7490	.3745	1.0224	-
Neuroticism	2	.8779	.4389	1.1983	-
Sex x Extraversion	2	3.9611	1.9806	5.4070	1%
Sex x Neuroticism	2	.2875	.1438	.3925	-
Extraversion x Neuroticism	4	1.6142	.4036	1.1017	-
Sex x Extraversion x Neuroticism	4	1.1365	.2841	.7757	-
Error	216	944.4153	.3663		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attitudes to Curriculum. Age 8+.

Reading

Means	A : G LE	B : B ME	C : G ME	D : B HE	E : G HE	F : B LE
A 5.97		.21	.54	.73	.74	1.49
B 5.76			.33	.52	.52	1.28
C 5.43				.19	.20	.95
D 5.24					.01	.76
E 5.23						.75
F 4.48						

Shortest Significant Ranges	5%	1%
R_6	.3156	.4154
R_5	.3104	.4091
R_4	.3036	.4011
R_3	.2942	.3904
R_2	.2797	.3744

df = 38.46

P.E.

Means	A : G ME	B : G LE	C : B HE	D : B ME	E : G HE	F : B LE
A 7.23		.15	.82	1.03	1.04	1.20
B 7.08			.67	.88	.89	1.05
C 6.41				.21	.22	.38
D 6.20					.01	.17
E 6.19						.16
F 6.03						

Shortest Significant Ranges	5%	1%
R_6	.2615	.3442
R_5	.2572	.3390
R_4	.2516	.3324
R_3	.2438	.3234
R_2	.2318	.3102

df = 38.46

Means underscored by the same line are not significantly different.
Means not underscored by the same line are significantly different.

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Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Reading. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.5613	2.5613	7.3538	1%
Extraversion	2	.3961	.1980	.5686	-
Neuroticism	2	.1627	.0813	.2335	-
Sex x Extraversion	2	.7914	.3957	1.1361	-
Sex x Neuroticism	2	.2325	.1163	.3338	-
Extraversion x Neuroticism	4	1.0987	.2747	.7886	-
Sex x Extraversion x Neuroticism	4	3.4617	.8654	2.4847	5%
Error	216	896.1562	.3483		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Reading. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.2013	1.2013	3.8354	-
Extraversion	2	1.1454	.5727	1.8286	-
Neuroticism	2	.2191	.1096	.3498	-
Sex x Extraversion	2	.7842	.3921	1.2520	-
Sex x Neuroticism	2	.0182	.0091	.0291	-
Extraversion x Neuroticism	4	1.2957	.3239	1.0342	-
Sex x Extraversion x Neuroticism	4	1.0853	.2713	.8663	-
Error	216	812.5996	.3132		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to curriculum : maths.

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	1.91	3.88	3.37	5.33	4.47	3.75	3.45	4.26	3.48
Age 8+	Average	3.67	5.23	4.33	4.60	4.92	5.08	4.25	5.08	4.72
	Low	4.00	3.35	3.61	4.54	3.00	4.40	4.29	3.22	3.85
	High	3.69	2.80	3.31	2.87	3.36	3.29	3.25	3.13	3.30
Age 9+	Average	4.22	2.63	4.50	3.88	3.36	4.86	4.12	2.90	4.70
	Low	3.70	3.38	3.29	4.57	4.64	4.00	4.21	4.11	3.55
	High	3.70	3.50	4.00	3.62	3.86	3.78	3.67	3.68	3.88
Age 10+	Average	5.00	3.75	4.39	4.33	3.82	3.82	4.63	3.78	4.17
	Low	3.36	4.22	3.40	5.00	4.46	4.00	4.18	4.36	3.61

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Maths. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.5238	2.5238	5.1748	1%
Extraversion	2	.0542	.0271	.0556	-
Neuroticism	2	2.8086	1.4043	2.8795	-
Sex x Extraversion	2	2.0768	1.0384	2.1292	-
Sex x Neuroticism	2	1.1611	.5806	1.1904	-
Extraversion x Neuroticism	4	2.6080	.6520	1.3369	-
Sex x Extraversion x Neuroticism	4	1.5546	.3886	.7969	-
Error	216	1257.5180	.4877		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Maths. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.6087	.6087	1.8406	-
Extraversion	2	.9559	.4780	1.4453	-
Neuroticism	2	1.9567	.9784	2.9585	-
Sex x Extraversion	2	.6728	.3364	1.0173	-
Sex x Neuroticism	2	.8424	.4212	1.2737	-
Extraversion x Neuroticism	4	2.2620	.5655	1.7100	-
Sex x Extraversion x Neuroticism	4	.1940	.0485	.1465	-
Error	216	850.9520	.3307		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Maths. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.1043	.1043	.3711	-
Extraversion	2	.2574	.1287	.4580	-
Neuroticism	2	.6329	.3164	1.1261	-
Sex x Extraversion	2	.1086	.0543	.1932	-
Sex x Neuroticism	2	1.1495	.5748	2.0455	-
Extraversion x Neuroticism	4	1.0449	.2612	.9296	-
Error	216	728.9819	.2810		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to curriculum : P.E.

Group		Boys			Girls			Total		
Extroversion	Neuroticism	Low	Average	High	Low	Average	High	Low	Average	High
Age 8+	High	5.64	6.25	8.21	6.44	7.40	6.13	6.00	7.00	6.19
	Average	6.11	6.46	7.25	7.60	7.69	5.85	7.04	7.08	6.52
	Low	6.36	6.00	6.13	6.92	6.50	6.70	6.67	6.19	6.30
Age 9+	High	6.23	6.50	6.46	6.20	7.14	6.57	6.21	6.88	6.50
	Average	5.72	5.74	6.21	5.75	5.36	6.94	5.73	5.60	6.60
	Low	6.60	6.25	7.00	5.79	6.00	6.58	6.13	6.11	6.85
Age 10+	High	5.61	4.65	6.57	6.00	6.29	6.11	5.75	5.46	6.31
	Average	6.33	6.83	5.83	5.13	7.18	5.82	5.67	7.00	5.83
	Low	6.00	5.11	6.05	6.55	5.77	6.18	6.27	5.50	6.10

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. P.E. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.2907	1.2907	5.1320	5%
Extraversion	2	.3485	.1743	.6929	-
Neuroticism	2	.7870	.3935	1.5646	-
Sex x Extraversion	2	1.5835	.7917	3.1481	5%
Sex x Neuroticism	2	.0253	.0127	.0504	-
Extraversion x Neuroticism	4	.7909	.1977	.7862	-
Sex x Extraversion x Neuroticism	4	1.4554	.3638	1.4467	-
Error	216	648.5090	.2515		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. P.E. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0080	.0080	.0179	-
Extraversion	2	1.1224	.5612	1.2550	-
Neuroticism	2	1.0249	.5125	1.1459	-
Sex x Extraversion	2	.1307	.0654	.1462	-
Sex x Neuroticism	2	.4675	.2338	.5227	-
Extraversion x Neuroticism	4	.9713	.2428	.5430	-
Sex x Extraversion x Neuroticism	4	.5217	.2916	.1304	-
Error	216	1150.6763	.4472		

Harmonic Mean Group n = 11.9117

(129 with 120)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. P.E. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.2335	.2335	.7974	-
Extraversion	2	.0811	.0406	.1386	-
Neuroticism	2	.3271	.1636	.5586	-
Sex x Extraversion	2	.9675	.4837	1.6521	-
Sex x Neuroticism	2	.5999	.2999	1.0244	-
Extraversion x Neuroticism	4	3.4928	.8732	2.9822	5%
Sex x Extraversion x Neuroticism	4	.9133	.7798	.2283	-
Error	216	759.5025			

Harmonic Mean Group n = 12.0104

Significance of differences between means :

Attitudes to Curriculum. Age 10+.

P.E.

Means	A : MN ME	B : HN HE	C : LN LE	D : LN HE	E : MN HE	F : HN LE	G : MN LE	H : LN ME	I : HN ME	Shortest Significant Ranges	5%	1%
A 7.00		.69	.73	.90	1.17	1.25	1.33	1.5	1.54	R_9	.3639	.4876
B 6.31			.04	.21	.48	.56	.64	.81	.85	R_8	.3612	.4837
C 6.27				.17	.44	.52	.60	.77	.81	R_7	.3579	.4791
D 6.10					.27	.35	.43	.60	.64	R_6	.3537	.4736
E 5.83						.08	.16	.33	.37	R_5	.3483	.4667
F 5.75							.08	.25	.29	R_4	.3412	.4577
G 5.67								.17	.21	R_3	.3311	.4455
H 5.50									.04	R_2	.3152	.4272
I 5.46										df = 24.91		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Means of personality groups

Attitudes to curriculum : art

	Group Extraversion / Neuroticism	Boys Low	Boys Average	Boys High	Girls Low	Girls Average	Girls High	Total Low	Total Average	Total High
Age 8+	High	6.55	6.13	4.90	5.33	6.53	7.50	6.00	6.39	5.67
	Average	7.44	6.00	5.25	7.47	7.15	5.62	7.46	6.58	5.44
	Low	7.21	5.10	6.87	7.08	7.17	6.30	7.17	5.88	6.70
Age 9+	High	6.00	6.50	6.85	6.00	6.21	6.86	6.00	6.33	6.85
	Average	5.56	5.68	6.07	7.00	6.82	5.50	6.00	6.10	5.77
	Low	5.70	6.13	6.29	6.00	5.91	6.67	5.88	6.00	6.55
Age 10+	High	5.91	6.57	7.57	6.31	6.21	6.78	6.06	6.39	7.13
	Average	7.00	5.67	6.28	5.87	6.18	6.00	6.37	5.91	6.17
	Low	5.64	6.89	6.50	6.18	6.00	5.18	5.91	6.36	6.03

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum, Art, Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.1961	1.1961	3.4106	-
Extraversion	2	1.8968	.9484	2.7044	-
Neuroticism	2	.7123	.3562	1.0156	-
Sex x Extraversion	2	2.2654	1.1327	3.2298	5%
Sex x Neuroticism	2	.0184	.0092	.0262	-
Extraversion x Neuroticism	4	3.4520	.8630	2.4608	5%
Sex x Extraversion x Neuroticism	4	3.6460	.9115	2.5991	5%
Error	216	904.3801	.3507		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attitudes to Curriculum. Age 8+.

Art

Means		A : B LE	B : G ME	C : G LE	D : G HE	E : B HE	F : B ME
A	7.07		.14	.26	.75	1.29	1.48
B	6.93			.12	.61	1.15	1.34
C	6.81				.49	1.03	1.22
D	6.32					.54	.73
E	5.78						.19
F	5.59						

Shortest Significant Ranges	5%	1%
R_6	.3088	.4065
R_5	.3037	.4003
R_4	.2971	.3925
R_3	.2879	.3819
R_2	.2737	.3663

df = 38.46

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attitudes to Curriculum. Age 8+.

Art Means		A : MN LE	B : LN LE	C : LN HE	D : MN ME	E : HN ME	F : HN LE	G : LN ME	H : HN HE	I : MN HE	Shortest Significant Ranges	5%	1%
A	7.46		.29	.76	.92	1.07	1.46	1.58	1.79	2.02	R_9	.3987	.5337
B	7.17			.50	.63	.78	1.17	1.29	1.50	1.73	R_8	.3953	.5294
C	6.70				.13	.28	.67	.79	1.00	1.23	R_7	.3917	.5243
D	6.58					.15	.54	.66	.87	1.10	R_6	.3871	.5183
E	6.39						.39	.51	.72	.95	R_5	.3812	.5107
F	6.00							.12	.33	.56	R_4	.3734	.5009
G	5.88								.21	.44	R_3	.3623	.4876
H	5.67									.23	R_2	.3449	.4675
I	5.44										df = 25.83		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Art. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.2665	.2665	.9150	-
Extraversion	2	.3267	.1634	.5610	-
Neuroticism	2	.3426	.1713	.5883	-
Sex x Extraversion	2	.3097	.1549	.5318	-
Sex x Neuroticism	2	.4552	.2276	.7817	-
Extraversion x Neuroticism	4	1.1444	.2861	.9825	-
Sex x Extraversion x Neuroticism	4	3.2140	.8035	2.7593	5%
Error	216	749.3101			

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to Curriculum. Art. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.6124	.6124	2.0878	-
Extraversion	2	.1642	.0821	.2800	-
Neuroticism	2	.8142	.4071	1.3881	-
Sex x Extraversion	2	.4369	.2185	.7449	-
Sex x Neuroticism	2	.0812	.0406	.1384	-
Extraversion x Neuroticism	4	1.7553	.4388	1.4962	-
Sex x Extraversion x Neuroticism	4	1.5201	.3800	1.2957	-
Error	216	761.0054	.2933		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : attitude to school

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	1.36	2.38	1.42	3.11	2.87	4.00	2.15	3.52	2.19
Age 8+	Average	2.33	3.00	1.67	3.73	4.23	2.92	3.21	3.62	2.32
	Low	2.00	2.60	1.61	4.15	3.08	3.80	3.17	2.78	2.27
	High	1.81	2.29	2.15	4.00	4.06	3.43	2.61	3.23	2.60
Age 9+	Average	2.13	2.42	2.20	4.09	3.46	4.00	3.26	2.80	3.25
	Low	1.90	2.83	2.23	4.14	3.88	3.00	3.21	3.15	2.64
	High	3.04	2.50	2.86	3.62	3.50	3.44	3.25	3.00	3.19
Age 10+	Average	3.33	2.75	3.00	3.67	3.09	4.18	3.52	2.91	3.45
	Low	2.55	2.78	3.20	4.73	4.38	3.91	3.64	3.74	3.45

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Attitude to School . Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	10.1550	10.1550	35.2483	1%
Extraversion	2	.6270	.3135	1.0881	-
Neuroticism	2	.6848	.3424	1.1886	-
Sex x Extraversion	2	1.3734	.6867	2.3835	-
Sex x Neuroticism	2	.0982	.0491	.1704	-
Extraversion x Neuroticism	4	1.5198	.3799	1.3188	-
Sex x Extraversion x Neuroticism	4	.7741	.6717	.1935	-
Error	216	742.9923	.2881		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Attitude to School. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	11.0450	11.0450	48.2104	1%
Extraversion	2	.3114	.1557	.6796	-
Neuroticism	2	.0263	.0132	.0574	-
Sex x Extraversion	2	.7140	.3570	1.5583	-
Sex x Neuroticism	2	.1185	.0593	.2587	-
Extraversion x Neuroticism	4	.4305	.1076	.4697	-
Sex x Extraversion x Neuroticism	4	.3107	.3390	.0777	-
Error	216	589.4793	.2291		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Attitude to School. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.0233	4.0233	15.3797	1%
Extraversion	2	.3563	.1782	.6811	-
Neuroticism	2	.5651	.2826	1.0802	-
Sex x Extraversion	2	.0357	.0179	.0683	-
Sex x Neuroticism	2	.6909	.3454	1.3205	-
Extraversion x Neuroticism	4	.2894	.0724	.2766	-
Sex x Extraversion x Neuroticism	4	.7991	.1998	.7637	-
Error	216	678.5589	.2616		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : interest in school

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	2.09	2.00	2.79	3.00	3.33	3.25	2.50	2.87	2.93
Age 8+	Average	2.33	2.77	2.50	3.27	3.46	3.54	2.92	3.12	3.04
	Low	2.18	2.45	1.70	3.77	3.08	3.30	3.04	2.69	2.18
	High	2.05	2.64	1.69	2.75	3.75	2.71	2.30	3.23	2.05
Age 9+	Average	2.38	2.58	2.60	3.27	2.91	3.50	3.05	2.87	3.50
	Low	2.20	2.33	2.47	2.93	3.00	3.20	2.63	2.54	2.86
	High	2.09	2.36	1.71	2.69	3.00	2.56	2.31	2.68	2.19
Age 10+	Average	2.67	2.50	2.72	3.13	2.73	3.18	2.93	2.61	2.90
	Low	2.09	2.56	2.65	3.18	3.85	3.00	2.64	3.32	3.45

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Interest in School. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.6920	4.6920	21.1352	1%
Extraversion	2	1.0220	.0110	.0496	-
Neuroticism	2	.2178	.1089	.4906	-
Sex x Extraversion	2	.0523	.0262	.1179	-
Sex x Neuroticism	2	.1432	.0716	.3225	-
Extraversion x Neuroticism	4	.5531	.1383	.6228	-
Sex x Extraversion x Neuroticism	4	.5001	.5632	.1250	-
Error	216	572.3832	.2220		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Interest in School, Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.7848	2.7848	14.2445	1%
Extraversion	2	.2270	.1135	.5806	-
Neuroticism	2	.2359	.1180	.6037	-
Sex x Extraversion	2	.0247	.0124	.0632	-
Sex x Neuroticism	2	.0552	.0276	.1413	-
Extraversion x Neuroticism	4	1.0556	.2639	1.3498	-
Sex x Extraversion x Neuroticism	4	2.9658	.7414	3.7926	-
Error	216	502.9077	.1955		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Interest in School, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.9801	1.9801	10.6512	1%
Extraversion	2	.1509	.0754	.4058	-
Neuroticism	2	.8354	.4177	2.2468	-
Sex x Extraversion	2	.0272	.0136	.0732	-
Sex x Neuroticism	2	.2105	.1053	.5663	-
Extraversion x Neuroticism	4	.6141	.1535	.8259	-
Sex x Extraversion x Neuroticism	4	.2067	.0517	.2780	-
Error	216	482.2997	.1859		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : importance of doing well

	Group Extraversion Neuroticism	Boys			Girls			Total		
		Low	Average	High	Low	Average	High	Low	Average	High
Age 8+	High	6.46	5.50	6.11	7.33	6.40	6.88	6.85	6.09	6.33
	Average	5.78	5.62	6.00	6.20	7.69	6.84	6.04	6.65	6.44
	Low	5.37	6.00	5.35	7.69	6.67	7.30	6.63	6.25	5.94
Age 9+	High	4.67	5.71	6.15	6.58	6.13	6.71	5.36	5.93	6.35
	Average	5.38	5.58	6.10	7.27	7.00	7.57	6.47	6.10	6.96
	Low	5.30	6.50	6.15	6.50	6.25	6.07	6.00	6.42	6.11
Age 10+	High	5.61	6.21	4.86	6.38	6.29	6.67	5.89	6.25	5.88
	Average	6.83	6.50	6.33	6.53	5.36	7.64	6.67	5.97	6.83
	Low	6.00	5.44	5.90	7.09	7.39	6.82	6.55	6.59	6.23

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Importance of Doing Well. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	6.4920	6.4920	15.6321	1%
Extraversion	2	.0769	.0385	.0926	-
Neuroticism	2	.0253	.0126	.0304	-
Sex x Extraversion	2	.0005	.0003	.0007	-
Sex x Neuroticism	2	.4987	.2493	.6004	-
Extraversion x Neuroticism	4	1.3314	.3329	.8015	-
Sex x Extraversion x Neuroticism	4	1.2825	.7720	.3206	-
Error	216	1070.7845	.4153		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Importance of Doing Well. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.0518	4.0518	10.2343	1%
Extraversion	2	.7755	.3878	.9795	-
Neuroticism	2	.7729	.3864	.9761	-
Sex x Extraversion	2	1.1700	.5850	1.4777	-
Sex x Neuroticism	2	1.2745	.6372	1.6096	-
Extraversion x Neuroticism	4	.4868	.1217	.3074	-
Sex x Extraversion x Neuroticism	4	.3099	.1957	.0775	-
Error	216	1018.5540	.3959		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Importance of Doing Well, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.3400	2.3400	6.7689	1%
Extraversion	2	.1484	.0742	.2147	-
Neuroticism	2	.9564	.4782	1.3833	-
Sex x Extraversion	2	.9172	.4589	1.3276	-
Sex x Neuroticism	2	1.4557	.7278	2.1054	-
Extraversion x Neuroticism	4	1.3021	.3255	.9417	-
Sex x Extraversion x Neuroticism	4	1.7386	.4346	1.2573	-
Error	216	896.7621	.3457		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : attitude to class

	Group	Boys			Girls			Total		
	Extroversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	8.00	8.63	8.89	10.89	10.80	9.50	9.30	10.04	9.07
Age 8+	Average	6.67	7.77	6.58	8.00	8.15	10.00	7.50	7.96	8.36
	Low	6.64	9.15	5.65	9.00	11.42	8.90	7.92	10.00	6.64
	High	10.48	10.43	7.92	10.58	11.13	10.14	10.52	10.80	8.70
Age 9+	Average	10.63	8.74	8.80	12.27	9.82	11.93	11.58	9.13	10.63
	Low	7.00	9.11	10.77	10.21	11.25	10.93	8.88	9.77	10.86
	High	8.74	9.29	10.57	11.77	9.57	12.78	9.83	9.43	11.81
Age 10+	Average	10.42	12.67	8.89	12.07	11.82	13.00	11.33	12.26	10.45
	Low	8.09	8.33	11.90	12.27	12.69	8.09	10.18	10.91	10.55

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Attitude to Class. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	19.3857	19.3857	20.9258	1%
Extraversion	2	4.7900	2.3950	2.5853	-
Neuroticism	2	7.7390	3.8695	4.1769	5%
Sex x Extraversion	2	.5355	.2678	.2890	-
Sex x Neuroticism	2	.7077	.3538	.3820	-
Extraversion x Neuroticism	4	6.7104	1.6776	1.8109	-
Sex x Extraversion x Neuroticism	4	55.6310	13.9078	15.0127	1%
Error	216	2388.6245	.9264		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attitudes to School. Age 8+.

Attitude to Class.

Means	A : HN	B : LN	C : MN
A 9.76		1.57	1.81
B 8.19			.24
C 7.95			

Shortest Significant Ranges

	5%	1%
R_3	.3252	.4216
R_2	.3091	.4111

df = 77.16

Conforming

Means	A : G HE	B : G LE	C : G ME	D : B ME	E : B LE	F : B HE
A 3.58		.28	.43	1.02	1.48	2.19
B 3.30			.15	.74	1.20	1.91
C 3.15				.59	1.05	1.76
D 2.56					.46	1.17
E 2.10						.71
F 1.39						

Shortest Significant Ranges

	5%	1%
R_6	.2278	.2998
R_5	.2240	.2953
R_4	.2191	.2895
R_3	.2124	.2817
R_2	.2019	.2702

df = 38.46

Means underscored by the same line are not significantly different.
Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Attitude to Class, Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	11.4880	11.4880	7.7319	1%
Extraversion	2	.0521	.0261	.0175	-
Neuroticism	2	.7108	.3554	.2392	-
Sex x Extraversion	2	.2168	.1084	.0730	-
Sex x Neuroticism	2	.7958	.3979	.2678	-
Extraversion x Neuroticism	4	13.5531	3.3883	2.2804	-
Sex x Extraversion x Neuroticism	4	4.4508	1.1127	.7489	-
Error	216	3822.8955	1.4858		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Attitude to Class. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	12.7681	12.7681	11.0460	1%
Extraversion	2	.2920	.1460	.1263	-
Neuroticism	2	5.3275	2.6630	2.3045	-
Sex x Extraversion	2	3.7592	1.8796	1.6261	-
Sex x Neuroticism	2	.0571	.0286	.0247	-
Extraversion x Neuroticism	4	6.9916	1.7479	1.5121	-
Sex x Extraversion x Neuroticism	4	25.9561	6.4890	5.6138	1%
Error	216	2998.7981	1.1559		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : 'other image'

	Group Extroversion Neuroticism	Boys			Girls			Total		
		Low	Average	High	Low	Average	High	Low	Average	High
Age 8+	High	1.82	2.50	2.16	2.78	3.40	2.88	2.25	3.09	2.37
	Average	2.22	2.77	2.25	2.67	3.23	2.85	2.50	3.00	2.56
	Low	2.91	2.65	2.26	3.31	3.42	3.00	3.13	2.94	2.49
Age 9+	High	3.05	3.00	2.15	3.67	2.88	1.71	3.27	2.93	2.00
	Average	3.75	2.53	2.80	3.55	3.00	3.21	3.63	2.70	3.04
	Low	3.10	2.22	2.23	3.21	3.75	3.07	3.17	2.69	2.68
Age 10+	High	1.96	3.14	2.57	2.92	3.00	3.78	2.31	3.07	3.25
	Average	2.83	2.75	2.44	3.60	3.55	2.73	3.26	3.13	2.55
	Low	2.27	3.00	3.50	3.73	3.39	2.73	3.00	3.23	3.23

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School . Other Image. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.9883	1.9883	14.1919	1%
Extraversion	2	.6596	.3298	2.3540	-
Neuroticism	2	.3724	.1862	1.3292	-
Sex x Extraversion	2	.0097	.0048	.0343	-
Sex x Neuroticism	2	.0984	.0492	.3511	-
Extraversion x Neuroticism	4	.3945	.0986	.7040	-
Sex x Extraversion x Neuroticism	4	.0598	.1067	.0149	-
Error	216	361.2196	.1401		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Other Image, Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.5760	.5760	4.4584	5%
Extraversion	2	2.2340	1.1170	8.6456	1%
Neuroticism	2	.4263	.2363	1.8269	-
Sex x Extraversion	2	.1692	.0846	.6584	-
Sex x Neuroticism	2	.5267	.2634	2.0384	-
Extraversion x Neuroticism	4	1.0289	.2572	1.9909	-
Sex x Extraversion x Neuroticism	4	.7286	.1821	1.4098	-
Error	216	332.5205	.1292		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attitudes to School. Age 9+.

Other Image

Means	A : LE	B : ME	C : HE		Shortest Significant Ranges 5%	1%
A 3.33		.55	.72	R_3	.1214	.1574
B 2.78			.17	R_2	.1155	.1535
C 2.61						

df = 77.76

Anxiety in Class

Means	A : LE	B : ME	C : HE		Shortest Significant Ranges 5%	1%
A 3.45		.53	1.10	R_3	.1388	.1799
B 2.92			.57	R_2	.1319	.1754
C 2.35						

df = 77.76

Social Adjustment

Means	A : LE	B : HE	C : ME		Shortest Significant Ranges 5%	1%
A 2.68		.18	.56	R_3	.1152	.1493
B 2.50			.38	R_2	.1095	.1456
C 2.12						

df = 77.76

Social Adjustment

Means	A : HN	B : MN	C : LN		Shortest Significant Ranges 5%	1%
A 2.80		.35	.81	R_3	.1152	.1493
B 2.45			.46	R_2	.1095	.1456
C 1.99						

df = 77.78

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

159/176/184/185

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Other Image, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.3723	1.3723	10.3960	1%
Extraversion	2	.2039	.1020	.7724	-
Neuroticism	2	.1312	.0656	.4970	-
Sex x Extraversion	2	.5963	.2982	2.2588	-
Sex x Neuroticism	2	.0855	.0428	.3240	-
Extraversion x Neuroticism	4	.9469	.2367	1.7933	-
Sex x Extraversion x Neuroticism	4	1.1923	.2981	2.2582	-
Error	216	342.3563	.1320		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : conforming

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	2.18	2.25	1.84	3.33	3.07	3.88	2.70	2.78	2.44
Age 8+	Average	2.22	2.69	1.00	3.07	3.08	3.31	2.75	2.89	2.20
	Low	1.91	2.60	1.22	3.54	3.33	3.70	1.95	2.88	1.97
	High	1.67	2.21	1.15	2.67	2.56	3.14	2.03	2.40	1.85
Age 9+	Average	1.88	2.16	1.00	2.82	3.00	2.79	2.42	2.47	2.04
	Low	2.20	2.44	2.23	2.71	2.63	3.27	2.50	2.50	2.79
	High	2.17	1.71	0.71	2.54	2.50	2.22	2.31	2.11	1.56
Age 10+	Average	2.08	2.00	1.78	3.53	2.73	2.46	2.89	2.35	2.04
	Low	1.91	2.00	1.35	3.18	2.92	3.00	2.54	2.55	1.94

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Conforming. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	8.5285	8.5285	44.6984	1%
Extraversion	2	.3617	.1809	.9479	-
Neuroticism	2	.1312	.0656	.3439	-
Sex x Extraversion	2	2.0633	1.0317	5.4071	1%
Sex x Neuroticism	2	.1444	.0722	.3785	-
Extraversion x Neuroticism	4	.4808	.1202	.6300	-
Sex x Extraversion x Neuroticism	4	.1229	.1610	.0307	-
Error	216	492.0410	.1908		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Conforming. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.1568	4.1568	25.4862	1%
Extraversion	2	.1809	.0904	.5545	-
Neuroticism	2	.4209	.2149	1.3178	-
Sex x Extraversion	2	1.0331	.5165	3.1670	5%
Sex x Neuroticism	2	.3312	.1656	1.0154	-
Extraversion x Neuroticism	4	.4680	.1170	.7173	-
Sex x Extraversion x Neuroticism	4	.0737	.0184	.1130	-
Error	216	419.5899	.1631		

Harmonic Mean Group n = 11.9117

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Significance of differences between means :

Attitudes to School. Age 9+.

Conforming Means	A : G HE	B : G LE	C : G ME	D : B ME	E : B LE	F : B HE
A 3.06		.33	.35	.78	1.21	1.56
B 2.73			.02	.45	.88	1.23
C 2.71				.43	.86	1.21
D 2.28					.43	.78
E 1.85						.35
F 1.50						

Shortest Significant Ranges

	5%	1%
R_6	.2106	.2772
R_5	.2071	.2730
R_4	.2026	.2677
R_3	.1963	.2605
R_2	.1867	.2498

df = 38.88

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Conforming, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.8776	4.8776	38.9897	1%
Extraversion	2	1.2783	.6392	5.1093	1%
Neuroticism	2	.7667	.3834	3.0645	-
Sex x Extraversion	2	.1636	.0818	.6539	-
Sex x Neuroticism	2	.1314	.0657	.5252	-
Extraversion x Neuroticism	4	.1966	.0491	.3929	-
Sex x Extraversion x Neuroticism	4	.5415	.1354	1.0821	-
Error	216	324.5651	.1251		

Harmonic Mean Group n = 12.0104

Significance of differences between means :

Attitudes to School. Age 10+.

Conforming

Means	A : LE	B : ME	C : HE
A 2.55		.23	.65
B 2.32			.42
C 1.90			

Shortest Significant Ranges

	5%	1%
R_3	.1195	.1549
R_2	.1136	.1511

df = 77.88

Anxiety in Class

Means	A : HE	B : ME	C : LE
A 3.33		.78	.85
B 2.55			.07
C 2.48			

Shortest Significant Ranges

	5%	1%
R_3	.1261	.1635
R_2	.1199	.1594

df = 77.88

Self Image

Means	A : MN	B : HN	C : LN
A 9.41		.78	1.80
B 8.63			1.02
C 7.61			

Shortest Significant Ranges

	5%	1%
R_3	.2946	.3820
R_2	.2801	.3725

df = 77.86

Anxiety in Class

Means	A : LN	B : MN	C : HN
A 3.49		.64	1.45
B 2.85			.81
C 2.04			

Shortest Significant Ranges

	5%	1%
R_3	.1261	.1635
R_2	.1199	.1594

df = 77.86

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

167/178/179/193

Means of personality groups

Attitudes to school : relationship with teacher

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	1.09	.88	1.47	3.11	2.47	2.63	2.00	1.91	1.82
Age 8+	Average	2.22	1.46	.67	2.40	2.00	2.08	2.33	1.73	1.40
	Low	2.27	1.35	1.44	2.69	2.92	1.70	2.50	1.94	1.52
	High	1.14	1.50	.62	2.17	2.50	2.43	1.52	2.03	1.40
Age 9+	Average	1.25	1.37	1.00	2.55	2.55	2.00	2.00	1.80	1.58
	Low	1.50	1.44	1.31	1.93	2.38	1.73	1.75	1.73	1.54
	High	1.13	1.29	1.00	1.69	1.64	2.11	1.33	1.46	1.63
Age 10+	Average	1.83	1.25	1.50	2.13	1.73	2.36	2.00	1.48	1.83
	Low	1.55	1.33	1.35	2.55	2.69	2.18	2.05	2.14	1.65

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Relationship with Teacher. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.6513	4.6513	28.6055	1%
Extraversion	2	1.2690	.6345	3.9022	5%
Neuroticism	2	.1979	.0990	.6086	-
Sex x Extraversion	2	.1093	.0547	.3361	-
Sex x Neuroticism	2	.7408	.3704	2.2780	-
Extraversion x Neuroticism	4	.6822	.1705	1.0488	-
Sex x Extraversion x Neuroticism	4	.9419	1.4482	.2355	-
Error	216	419.1641	.1626		

Harmonic Mean Group n = 11.9376

Significance of differences between means :

Attitudes to School. Age 8+.

Relationship with Teacher

Means	A : LE	B : ME	C : HE
A 2.29		.43	.71
B 1.86			.28
C 1.58			

Shortest Significant Ranges

	5%	1%
R_3	.1362	.1766
R_2	.1295	.1722

df = 76.92

Social Adjustment

Means	A : G LE	B : B ME	C : B HE	D : G HE	E : B LE	F : G ME
A 2.38		.09	.16	.35	.61	.90
B 2.29			.07	.26	.52	.81
C 2.22				.19	.45	.74
D 2.03					.26	.55
E 1.77						.30
F 1.48						

Shortest Significant Ranges

	5%	1%
R_6	.2152	.2833
R_5	.2117	.2791
R_4	.2071	.2736
R_3	.2007	.2662
R_2	.1908	.2554

df = 38.46

Means underscored by the same line are not significantly different.
Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Relationship with Teacher. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	4.6107	4.6107	33.9519	1%
Extraversion	2	.5869	.2935	2.1611	-
Neuroticism	2	.0177	.0089	.0653	-
Sex x Extraversion	2	.0201	.0101	.0742	-
Sex x Neuroticism	2	.3993	.1997	1.4703	-
Extraversion x Neuroticism	4	.0563	.0141	.1037	-
Sex x Extraversion x Neuroticism	4	.2198	.4046	.0550	-
Error	216	349.3555	.1358		

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Relationship with Teacher. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.1494	2.1494	15.7693	1%
Extraversion	2	.1070	.0535	.3926	-
Neuroticism	2	.6495	.3247	2.3825	-
Sex x Extraversion	2	.0114	.0057	.0419	-
Sex x Neuroticism	2	.3967	.1984	1.4554	-
Extraversion x Neuroticism	4	.2690	.0672	.4933	-
Sex x Extraversion x Neuroticism	4	2.8472	.7118	5.2223	1%
Error	216	353.6257	.1363		

Harmonic Mean Group n = 12.0104

Means of personality groups

Attitudes to school : anxiety in class

	Group Extraversion Neuroticism	Boys			Girls			Total		
		Low	Average	High	Low	Average	High	Low	Average	High
Age 8+	High	1.91	2.25	2.95	2.11	2.33	3.25	2.00	2.30	3.04
	Average	3.22	2.62	3.00	2.60	2.92	2.54	2.83	2.77	2.76
	Low	3.46	3.15	3.57	3.46	3.00	3.00	3.46	3.90	3.39
Age 9+	High	3.95	3.07	2.69	3.25	3.00	2.14	3.70	3.03	2.50
	Average	4.13	3.21	1.90	3.27	3.09	2.14	3.63	3.17	2.04
	Low	2.70	2.89	2.46	3.14	1.63	2.53	2.96	2.50	2.50
Age 10+	High	2.00	1.79	1.86	2.23	1.79	2.78	2.08	1.79	2.38
	Average	2.33	3.08	3.06	2.33	3.09	3.27	2.33	3.09	3.14
	Low	4.00	2.44	4.10	2.64	3.31	3.82	3.32	2.96	4.00

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Anxiety in Class, Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0470	.0470	.2876	-
Extraversion	2	.3780	.1890	1.156	-
Neuroticism	2	1.9635	.9818	6.0046	-
Sex x Extraversion	2	.0800	.0400	.2447	-
Sex x Neuroticism	2	.1968	.0984	.6020	-
Extraversion x Neuroticism	4	1.0785	.2696	1.6491	-
Sex x Extraversion x Neuroticism	4	.2014	.3079	.0503	-
Error	216	421.6252	.1635		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Anxiety in Class, Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.4387	.4387	2.6003	-
Extraversion	2	3.6155	1.8078	10.7159	1%
Neuroticism	2	.7447	.3723	2.2071	-
Sex x Extraversion	2	.1304	.0652	.3865	-
Sex x Neuroticism	2	.0367	.0184	.1089	-
Extraversion x Neuroticism	4	1.1719	.2920	1.7366	-
Sex x Extraversion x Neuroticism	4	1.1615	.2904	1.7212	-
Error	216	433.9266			

Harmonic Mean Group n = 11.9117

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Anxiety in Class. Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0200	.0200	.1436	-
Extraversion	2	1.2657	.6329	4.5431	5%
Neuroticism	2	5.2159	2.6080	18.7218	1%
Sex x Extraversion	2	.4423	.2212	1.5876	-
Sex x Neuroticism	2	.3073	.1537	1.1030	-
Extraversion x Neuroticism	4	1.0590	.2648	1.9006	-
Sex x Extraversion x Neuroticism	4	1.0157	.2539	1.8228	-
Error	216	361.3600			

Harmonic Mean Group n = 12.0104

(176 with 159)

Means of personality groups

Attitudes to school : social adjustment

	Group	Boys			Girls			Total		
	Extraversion	Low	Average	High	Low	Average	High	Low	Average	High
	Neuroticism									
	High	1.36	2.13	2.16	1.89	1.80	1.25	1.60	1.91	1.89
Age 8+	Average	2.11	2.69	2.25	2.27	1.39	1.77	2.21	2.04	2.00
	Low	1.91	2.10	2.26	2.85	1.17	3.00	2.42	1.75	2.49
	High	3.19	2.57	3.15	3.08	2.25	2.14	3.15	2.40	2.80
Age 9+	Average	2.88	2.32	2.60	2.91	1.73	2.50	2.89	2.10	2.54
	Low	2.00	1.72	2.39	1.79	2.00	2.13	1.88	1.81	2.25
	High	2.57	3.43	2.57	2.39	2.00	3.33	2.50	2.71	3.00
Age 10+	Average	3.25	3.50	2.94	2.47	2.46	2.91	2.82	3.00	2.93
	Low	3.00	3.00	3.55	2.09	3.00	2.27	2.55	3.00	3.10

(178/179 with 167)

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Social Adjustment, Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.1387	.1387	.8139	-
Extraversion	2	.1839	.0920	.5396	-
Neuroticism	2	.6399	.3200	1.8776	-
Sex x Extraversion	2	1.4668	.7338	4.3040	5%
Sex x Neuroticism	2	.4765	.2382	1.3981	-
Extraversion x Neuroticism	4	1.0514	.2629	1.5425	-
Sex x Extraversion x Neuroticism	4	.5785	.8487	.1446	-
Error	216	439.4646	.1704		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Social Adjustment. Age 9+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.2913	.2913	2.5072	-
Extraversion	2	.9385	.4693	4.0384	1%
Neuroticism	2	1.6369	.8185	7.0435	1%
Sex x Extraversion	2	.1016	.0508	.4372	-
Sex x Neuroticism	2	.1329	.0664	.5718	-
Extraversion x Neuroticism	4	.5728	.1432	1.2323	-
Sex x Extraversion x Neuroticism	4	.3012	.0753	.6480	-
Error	216	298.8825	.1162		

Harmonic Mean Group n = 11.9117

(182 with 170) 183

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Social Adjustment, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	1.3285	1.3285	13.1791	1%
Extraversion	2	.3276	.1638	1.6250	-
Neuroticism	2	.1281	.0641	.6356	-
Sex x Extraversion	2	.3216	.1608	1.5952	-
Sex x Neuroticism	2	.1617	.0809	.8022	-
Extraversion x Neuroticism	4	.1400	.0350	.3471	-
Sex x Extraversion x Neuroticism	4	1.5576	.3894	3.8632	1%
Error	216	261.4770	.1008		

Harmonic Mean Group n = 12.0104

(184/185 with 159)

Means of personality groups

Attitudes to school : self image

	Group	Boys			Girls			Total		
	Neuroticism	Low	Average	High	Low	Average	High	Low	Average	High
	Extraversion									
	High	7.27	8.50	8.79	8.22	8.47	9.38	7.70	8.48	8.96
Age 8+	Average	4.89	7.15	6.92	6.80	7.77	9.46	6.08	7.46	8.24
	Low	8.46	9.55	6.91	8.31	8.75	8.30	8.38	9.25	7.33
	High	9.38	9.36	8.23	10.50	10.63	9.14	9.79	10.03	8.55
Age 9+	Average	10.25	8.58	8.20	9.82	9.73	7.79	10.00	9.00	7.96
	Low	10.10	9.44	8.08	8.00	7.75	8.00	8.88	8.92	8.04
	High	9.52	8.50	7.29	7.69	8.79	8.67	8.86	8.64	8.06
Age 10+	Average	8.08	8.75	10.56	9.60	7.46	11.36	8.93	8.13	10.86
	Low	9.64	10.00	10.75	8.91	11.23	10.09	9.27	10.73	10.52

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School. Self Image. Age 8+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	2.7378	2.7378	.5687	-
Extraversion	2	4.0488	2.0244	.4204	-
Neuroticism	2	6.2020	3.1010	.6441	-
Sex x Extraversion	2	1.8986	.9493	.1972	-
Sex x Neuroticism	2	1.9586	.9793	.2034	-
Extraversion x Neuroticism	4	5.9005	1.4751	.3064	-
Sex x Extraversion x Neuroticism	4	.4134	.1033	.0215	-
Error	216	12413.5625	4.8142		

Harmonic Mean Group n = 11.9376

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Self Image, Age 9+,

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0038	.0038	.0059	-
Extraversion	2	6.5160	3.2580	5.1122	1%
Neuroticism	2	2.8719	1.4359	2.2532	-
Sex x Extraversion	2	.4458	.2229	.3498	-
Sex x Neuroticism	2	4.3234	2.1617	3.3920	5%
Extraversion x Neuroticism	4	.8913	.2228	.3496	-
Sex x Extraversion x Neuroticism	4	1.3324	.3331	.5227	-
Error	216	1639.7559	.6373		

Harmonic Mean Group n = 11.9117

Significance of differences between means :

Attitudes to School. Age 9+.

Self Image

Means	A : LE	B : ME	C : HE
A 9.55		.21	1.40
B 9.34			1.19
C 8.15			

Shortest Significant Ranges

	5%	1%
R_3	.2697	.3497
R_2	.2564	.3410

df = 77.76

Self Image

Means	A : G HN	B : B LN	C : B HN	D : G MN	E : B MN	F : G LN
A 10.29		1.12	1.23	1.29	1.45	2.34
B 9.17			.11	.17	.33	1.22
C 9.06				.06	.22	1.11
D 9.00					.16	1.05
E 8.84						.89
F 7.95						

Shortest Significant Ranges

	5%	1%
R_6	.4162	.5479
R_5	.4094	.5397
R_4	.4005	.5291
R_3	.3881	.5149
R_2	.3690	.4938

df = 38.89

Means underscored by the same line are not significantly different.
Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Extraversion x Neuroticism x Sex

Attitudes to School, Self Image, Age 10+.

Source	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.0280	.0280	.0368	-
Extraversion	2	2.5257	1.2629	1.6608	-
Neuroticism	2	8.6102	4.3051	5.6616	1%
Sex x Extraversion	2	.5461	.2731	.3591	-
Sex x Neuroticism	2	.1573	.0787	.1035	-
Extraversion x Neuroticism	4	8.9175	2.2294	2.9318	5%
Sex x Extraversion x Neuroticism	4	5.2688	1.3172	1.7323	-
Error	216	1972.6992	.7604		

Harmonic Mean Group n = 12.0104

Significance of differences between means :

Attitudes to School, Age 10+.

Self Image Means	A : MN HE	B : LN ME	C : LN HE	D : LN LE	E : MN LE	F : HN LE	G : HN ME	H : MN ME	I : HN HE	Shortest Significant Ranges	5%	1%
A 10.86		.13	.34	1.59	1.93	2.00	2.22	2.73	2.80	R_9	.5864	.7858
B 10.73			.21	1.46	1.80	1.87	2.09	2.60	2.67	R_8	.5821	.7796
C 10.52				1.25	1.59	1.66	1.88	2.39	2.46	R_7	.5768	.7721
D 9.27					.34	.41	.63	1.14	1.21	R_6	.5701	.7632
E 8.93						.07	.29	.80	.87	R_5	.5614	.7521
F 8.86							.22	.73	.80	R_4	.5499	.7376
G 8.64								.51	.58	R_3	.5335	.7180
H 8.12									.07	R_2	.5079	.6884
I 8.06										df = 24.91		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

(193 with 167)

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spelling. 8+. Data y. Attainment Tests. Spelling. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	9.4903	4.7197	2.3472		1	1.8396	1.8396	.8254	
Extraversion	2	19.1229	12.8656	8.9757		2	1.6606	.8303	.3725	
Neuroticism	2	12.7953	8.4774	5.9662		2	1.3178	.6589	.2956	
Sex x Extraversion	2	2.7237	3.3895	4.9253		2	.9635	.4817	.2161	
Sex x Neuroticism	2	8.2946	6.1406	4.4044	.938	2	.1815	.0908	.0407	
Extraversion x Neuroticism	4	17.2525	23.5525	33.4191		4	4.4149	1.1037	.4952	
Sex x Extraversion x Neuroticism	4	20.0033	34.7925	57.7286		4	10.0509	2.5127	1.1273	
Error	216	16456.9041	15432.0093	20191.4831		215	479.2036	2.2289		
Total	233					232				

Harmonic Mean Group n = 11.9376 Homogeneity of Covariance : Between Cells 17 50.9563 1.5048

198 428.2473

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spelling. 9+. Data y. Attainment Tests. Spelling. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.4835	1.6373	5.5445		1	3.6147	3.6147	1.8645	
Extraversion	2	124.5986	101.7501	83.2005		2	3.4594	1.7297	.8922	
Neuroticism	2	9.5154	6.1201	5.6799		2	1.7443	.8722	.4499	
Sex x Extraversion	2	13.5710	14.4917	17.1186		2	3.9878	1.9939	1.0285	
Sex x Neuroticism	2	4.6587	3.1146	2.6852		2	.6042	.3021	.1558	
Extraversion x Neuroticism	4	50.2999	41.0997	40.0420		4	7.8255	1.9564	1.0091	
Sex x Extraversion x Neuroticism	4	30.7825	27.9429	30.0583		4	6.3934	1.5984	.8244	
Error	216	18308.3487	11938.6297	12749.9895		215	416.8144	1.9387		
Total	233					232				
Harmonic Mean Group n = 11.9117					Homogeneity of Covariance : Between Cells	17	73.8904		2.7251	
						198	342.9240			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Reading. 8+. Data y. Attainment Tests. Reading. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	9.0596	6.5553	4.7432		1	.0085	.0085	.0022	
Extraversion	2	18.2823	15.3640	23.7915		2	11.0151	5.5075	1.4023	
Neuroticism	2	6.7771	11.2135	19.9911		2	6.9276	3.4638	.8820	
Sex x Extraversion	2	14.0440	-.3491	.0103		2	8.5232	4.2616	1.0851	
Sex x Neuroticism	2	2.0397	5.3697	14.1964	.754	2	7.2549	3.6274	.9236	
Extraversion x Neuroticism	4	30.2420	17.4518	19.3920		4	10.2703	2.5676	.6538	
Sex x Extraversion x Neuroticism	4	2.4029	9.2277	53.0484		4	40.4908	10.1227	2.5575	5%
Error	216	19986.7460	15077.4821	21454.0252		215	844.3878	3.9274		
Total	233	1674.2684	1263.0246	1686.4916		232				

Harmonic Mean Group n = 11.9376 Homogeneity of Covariance : Between Cells 17 62.3755 1.0088

198 782.0123

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Reading 9+. Data y. Attainment Tests. Reading. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	9.1165	12.0272	15.8672		1	3.7131	3.7131	1.5115	
Extraversion	2	105.5004	107.1557	109.4469		2	12.3705	6.1852	2.5178	
Neuroticism	2	.0183	.0263	4.5682		2	4.5409	2.2704	.9242	
Sex x Extraversion	2	13.8174	16.6567	20.0876		2	3.8075	1.9038	.7750	
Sex x Neuroticism	2	7.9065	11.4124	16.4738		2	4.5959	2.2979	.9354	
Extraversion x Neuroticism	4	96.2051	93.4735	91.6488		4	8.9189	2.2297	.9076	
Sex x Extraversion x Neuroticism	4	55.1282	38.2192	32.1112		4	5.6230	1.4058	.5722	
Error	216	19934.7676	13574.1918	15534.3825		215	528.1615	2.4566		
Total	233					232				
Harmonic Mean Group n = 11.9117					Homogeneity of Covariance : Between Cells	17	49.7057		1.3139	
						198	478.4558			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Number. 8+. Data y. Attainment Tests. Number. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	8.7501	3.3676	1.2961		1	2.2709	2.2709	.8920	
Extraversion	2	26.8905	35.9697	58.0820		2	15.2276	7.6138	2.9906	
Neuroticism	2	3.0784	-1.3388	1.2229		2	6.0797	3.0399	1.1940	
Sex x Extraversion	2	1.1484	1.9782	6.3232		2	3.7028	1.8514	.7272	
Sex x Neuroticism	2	.8616	-.4180	.2041		2	1.6413	.8207	.3223	
Extraversion x Neuroticism	4	7.1859	3.6152	8.0123		4	7.2938	3.6469	1.4325	
Sex x Extraversion x Neuroticism	4	43.3996	23.1453	2.8349		4	3.8756	.9689	.3806	
Error	216	7692.8122	6881.9194	12690.7086		215	547.3635	2.5459		
Total	233					232				
Harmonic Mean Group n = 11.9376					Homogeneity of Covariance : Between Cells	17	52.1633		1.3322	
						198	495.2002			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Number. 9+. Data y. Attainment Tests. Number. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	6.1133	-5.4198	4.8050		1	14.3431	14.3431	8.1117	1%
Extraversion	2	56.4439	64.1559	73.4993		2	14.1246	7.0623	3.9941	5%
Neuroticism	2	32.3815	29.8441	27.7315		2	2.6873	1.3436	.7599	
Sex x Extraversion	2	5.4326	.7742	2.9503		2	4.2141	2.1071	1.1916	
Sex x Neuroticism	2	.5461	.9668	1.7472	.6203	2	.7265	.3632	.2054	
Extraversion x Neuroticism	4	35.5457	31.4869	31.0866		4	5.2406	1.3102	.7410	
Sex x Extraversion x Neuroticism	4	18.9090	11.5817	15.2801		4	8.2070	2.0517	1.1604	
Error	216	11896.9146	7380.2460	9106.6957		215	380.1610	1.7682		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 28.2318 1.0145

198 351.9291

Significance of differences between means :

Attainment Tests. Number. Age 10+. Adjusted for differences at 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 38.96		.92	2.08	R_3	.4493	.5825
B 38.05			1.16	R_2	.4271	.5680
C 36.89				df = 77.76		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Comp/Vocab. 8+. Data y. Attainment Tests. Comp/Vocab. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.6087	-.6160	.6235		1	1.8099	1.8099	.9142	
Extraversion	2	30.5572	34.2024	39.0483		2	5.8160	2.9080	1.4689	
Neuroticism	2	16.0202	10.0770	7.7206		2	1.4930	.7465	.3771	
Sex x Extraversion	2	18.6226	5.7199	1.9235		2	3.2198	1.6099	.8132	
Sex x Neuroticism	2	67.8367	49.7571	37.3533		2	.8875	.4438	.2242	
Extraversion x Neuroticism	4	31.9944	28.1538	32.8801		4	9.0030	2.2507	1.1369	
Sex x Extraversion x Neuroticism	4	21.7020	24.9949	32.8589		4	8.2554	2.0638	1.0425	
Error	216	14245.2878	10147.2235	12309.2135		215	426.6407	1.9797		
Total	233					232				
Harmonic Mean Group n = 11.9376					Homogeneity of Covariance : Between Cells	17	43.2507		1.4305	
						198	382.3901			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Comp/Vocab. 9+. Data y. Attainment Tests. Comp/Vocab. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y		Sig.
Sex	1	.3227	-1.7539	9.5339		1	12.3565	12.3565	4.1011	5%
Extraversion	2	91.1930	110.5675	134.6381		2	19.7147	9.8573	3.2716	5%
Neuroticism	2	4.2852	3.5164	3.2022		2	.3364	.1682	.0558	
Sex x Extraversion	2	4.5220	8.4084	16.0167		2	5.9191	2.9595	.9823	
Sex x Neuroticism	2	7.3128	4.1678	19.5574	.7527	2	17.4260	8.7130	2.8918	
Extraversion x Neuroticism	4	42.7619	58.3229	88.1373		4	24.5110	6.1277	2.0338	
Sex x Extraversion x Neuroticism	4	25.4647	30.4589	36.8963		4	5.4612	1.3653	.4531	
Error	216	12010.5070	9039.7158	14520.0118		215	647.7886	3.0130		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 62.9362 1.3610

198 584.8525

Significance of differences between means :

Attainment Tests. Comp/Vocab. Age 10+. Adjusted for differences at 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 49.93		.80	2.47	R_3	.5865	.7603
B 49.13			1.67	R_2	.5575	.7414
C 47.46				df = 77.76		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Verbal Reasoning. 8+. Data y. Attainment Tests. Verbal Reasoning. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	1.0464	.8993	.7729		1	.1824	.1824	.0373	
Extraversion	2	31.0179	33.9911	42.2190		2	18.2084	9.1042	1.8635	
Neuroticism	2	.9613	1.5386	9.8112		2	8.6389	4.3195	.8841	
Sex x Extraversion	2	8.6671	4.3954	18.6247		2	16.4324	8.2162	1.6817	
Sex x Neuroticism	2	39.7181	27.9637	17.7232		2	.7574	.3787	.0775	
Extraversion x Neuroticism	4	22.0527	2.7126	27.2246		4	29.1314	7.2828	1.4907	
Sex x Extraversion x Neuroticism	4	28.0346	-.6440	43.8887		4	49.9237	12.4809	2.5546	5%
Error	216	16960.2714	7495.6266	15852.0985		215	1050.4114	4.8856		
Total	233					232				
Harmonic Mean Group n = 11.9376					Homogeneity of Covariance : Between Cells	17	56.0123		.7124	
						198	994.3991			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Verbal Reasoning. 9+. Data y. Attainment Tests. Verbal Reasoning. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	1.8883	3.3004	5.7687		1	3.5631	3.5631	.8420	
Extraversion	2	58.3639	76.4089	105.5492		2	56.3570	28.1785	6.6586	1%
Neuroticism	2	13.3999	10.1411	7.7016		2	1.7852	.8926	.2109	
Sex x Extraversion	2	9.6178	-2.6376	.8345		2	4.1518	2.0759	.4905	
Sex x Neuroticism	2	2.3171	.8651	1.4995	.3741	2	1.1765	.5883	.1390	
Extraversion x Neuroticism	4	12.9412	16.9765	35.9615		4	25.0646	6.2662	1.4807	
Sex x Extraversion x Neuroticism	4	30.1550	28.1521	50.1900		4	33.3280	8.3320	1.9689	
Error	216	15733.5932	5886.2973	13040.1349		215	909.8564	4.2319		
Total	233					232				
Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells						17	71.3809		1.0767	
						198	838.4754			

Significance of differences between means :

Attainment Tests. Verbal Reasoning. Age 10+. Adjusted for differences at 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 44.68		2.41	4.16	R_3	.6951	.9011
B 42.27			1.75	R_2	.6607	.8787
C 40.52				df =	77.88	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Numerical Problems. 8+. Data y. Attainment Tests. Numerical Problems. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	4.3414	8.0493	14.9240		1	6.2383	6.2383	3.8148	
Extraversion	2	37.9295	37.2362	37.8851		2	5.3633	2.6816	1.6398	
Neuroticism	2	.5009	.3920	1.3761		2	1.0775	.5387	.3294	
Sex x Extraversion	2	4.9488	4.2149	4.9341		2	1.5354	.7677	.4694	
Sex x Neuroticism	2	4.6467	6.7530	11.7232		2	4.8681	2.4341	1.4884	
Extraversion x Neuroticism	4	12.1068	6.6744	5.0065		4	1.4575	.3644	.2228	
Sex x Extraversion x Neuroticism	4	10.0758	1.3695	6.9970		4	9.5255	2.3814	1.4562	
Error	216	13882.1839	9095.1257	10156.0109		215	351.5949	1.6353		
Total	233					232				
Harmonic Mean Group n = 11.9376					Homogeneity of Covariance : Between Cells	17	39.9807		1.6226	
						198	311.6143			

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Numerical Problems. 9+. Data y. Attainment Tests. Numerical Problems. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	24.9689	14.0273	7.8805		1	.7357	.7357	.3318	
Extraversion	2	52.9860	66.0044	85.7797		2	17.3744	8.6872	3.9176	5%
Neuroticism	2	22.6934	21.7988	23.0287		2	3.2551	1.6275	.7340	
Sex x Extraversion	2	1.0161	-3.1180	9.7866		2	14.9070	7.4535	3.3612	
Sex x Neuroticism	2	1.6615	1.2600	1.5307	.7337	2	.5762	.2881	.1299	
Extraversion x Neuroticism	4	29.8758	19.4615	19.7392		4	7.2631	1.8158	.8188	
Sex x Extraversion x Neuroticism	4	5.5107	6.8922	9.4165		4	2.2688	.5672	.2558	
Error	216	9600.0941	7043.1224	10846.2689		215	476.7642	2.2175		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 32.8745 .9366

198 443.8898

Significance of differences between means :

Attainment Tests. Numerical Problems. Age 10+. Adjusted for differences at 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 43.03		1.09	2.01	R_3	.5031	.6523
B 41.94			.92	R_2	.4783	.6360
C 41.02				df =	77.88	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Spatial Reasoning. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	17.2089	-3.7058	.7980		1	7.6666	7.6666	1.9046	
Extraversion	2	33.2969	57.4002	122.5887		2	77.3549	38.6774	9.6083	1%
Neuroticism	2	4.2090	3.0354	8.8568		2	6.9716	3.4858	.8659	
Sex x Extraversion	2	19.2288	17.0729	16.3111		2	4.7937	2.3969	.5954	
Sex x Neuroticism	2	3.4173	2.6389	4.8152	.4525	2	3.1267	1.5634	.3884	
Extraversion x Neuroticism	4	18.7095	13.3979	29.8040		4	21.5137	5.3784	1.3361	
Sex x Extraversion x Neuroticism	4	69.2920	30.7590	31.7804		4	18.1314	4.5329	1.1261	
Error	216	16370.7095	7529.3180	13715.9804		215	865.4715	4.0254		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 41.7775 .6415

198 823.6940

Significance of differences between means :

Attainment Tests. Spatial Reasoning. Age 10+. Adjusted for differences at 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 48.42		2.61	5.03	R_3	.6779	.8788
B 45.82			2.42	R_2	.6444	.8569
C 43.40				df = 77.88		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Spelling. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Square y	Mean Square y	'F'	Sig.
Sex	1	17.2089	-2.8844	.4835		1	2.2607	2.2607	.3274	
Extraversion	2	33.2969	59.8540	124.5986		2	102.3459	51.1729	7.4102	1%
Neuroticism	2	4.2090	-3.7127	9.5154		2	11.1223	5.5612	.8053	
Sex x Extraversion	2	19.2288	16.0798	13.5710		2	8.0213	4.0106	.5808	
Sex x Neuroticism	2	3.4173	.9445	4.6587	.1950	2	4.4203	2.2101	.3200	
Extraversion x Neuroticism	4	18.7095	18.3599	50.2999		4	43.8372	10.9593	1.5870	
Sex x Extraversion x Neuroticism	4	69.2920	39.5331	30.7825		4	17.9572	4.4893	.6501	
Error	216	16370.7095	3192.6230	18308.3487		215	1484.7353	6.9057		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 226.7099 2.2791

198 1258.0254

Significance of differences between means :

Attainment Tests. Spelling. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 48.85		2.48	5.13	R_3	.8869	1.1511
B 46.38			2.65	R_2	.8441	1.1224
C 43.73				df = 77.66		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 10+. Data y. Attainment Tests. Spelling. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.7980	2.1035	5.5445		1	4.4126	4.4126	.9706	
Extraversion	2	122.5887	100.3550	83.2005		2	35.7590	17.8795	3.9329	5%
Neuroticism	2	8.8568	6.0092	5.6799		2	2.9792	1.4896	.3277	
Sex x Extraversion	2	16.3111	16.6892	17.1186		2	8.9410	4.4705	.9834	
Sex x Neuroticism	2	4.8152	-.4655	2.6852	.2841	2	3.3382	1.6691	.3672	
Extraversion x Neuroticism	4	29.8090	33.4726	40.0420		4	23.3818	5.8455	1.2858	
Sex x Extraversion x Neuroticism	4	31.7804	12.1924	30.0583		4	25.6947	6.4237	1.4130	
Error	216	13715.9804	3897.1353	12749.9895		215	977.4165	4.5461		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	99.4317		1.4323	
							877.9848			

Significance of differences between means :

Attainment Test. Spelling. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 46.06		1.29	2.73	R_3	.7204	.9339
B 44.77			1.44	R_2	.6848	.9107
C 43.33				df =	77.88	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Reading. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	17.2089	12.5253	15.8672		1	11.4536	11.4536	1.5329	
Extraversion	2	33.2969	59.2234	109.4469		2	86.2089	43.2089	5.7491	1%
Neuroticism	2	4.2090	.1059	4.5682		2	4.7013	2.3507	.3128	
Sex x Extraversion	2	19.2288	15.1373	20.0876		2	14.6862	7.3431	.9770	
					.2048					
Sex x Neuroticism	2	3.4173	2.7045	16.4738		2	15.5091	7.7546	1.0318	
Extraversion x Neuroticism	4	18.7095	22.0792	91.6488		4	83.3695	20.8424	2.7731	5%
Sex x Extraversion x Neuroticism	4	69.2920	57.8905	32.1112		4	11.1892	2.7973	.3722	
Error	216	16370.7095	3352.7624	19934.7676		215	1615.8998	7.5158		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	328.1195		3.2224	
						198	1287.7803			

Significance of differences between means :

Attainment Tests. Reading. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 51.27		.56	3.93	R_3	.9263	1.2008
B 50.71			3.37	R_2	.8805	1.1710
C 47.34				df =	77.88	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attainment Tests. Reading. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : LN ME	B : HN HE	C : LN HE	D : MN LE	E : MN ME	F : MN HE	G : HN ME	H : HN LE	I : LN LE	Shortest Significant Ranges	5%	1%
A 54.71		1.73	4.47	4.59	5.17	5.50	5.68	6.73	11.13	R_9	1.8436	2.4705
B 52.98			2.75	2.86	3.44	3.77	3.96	5.00	9.41	R_8	1.8299	2.4508
C 50.24				.12	.70	1.03	1.21	2.26	6.66	R_7	1.8135	2.4273
D 50.12					.58	.91	1.09	2.14	6.55	R_6	1.7922	2.3994
E 49.54						.33	.51	1.56	5.96	R_5	1.7648	2.3644
F 49.21							.18	1.23	5.64	R_4	1.7287	2.3190
G 49.03								1.05	5.45	R_3	1.6773	2.2572
H 47.98									1.05	R_2	1.5969	2.1642
I 43.57										df =		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 10+. Data y. Attainment Tests. Reading. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.7980	-3.5584	15.8672		1	18.1253	18.1253	3.2592	
Extraversion	2	122.5887	109.1790	109.4469		2	53.6121	26.8061	4.8201	1%
Neuroticism	2	8.8568	1.3880	4.5682		2	4.5503	2.2751	.4091	
Sex x Extraversion	2	16.3111	18.0270	20.0876		2	10.5471	5.2736	.9483	
Sex x Neuroticism	2	4.8152	-2.6993	16.4738	.3069	2	18.5827	9.2914	1.6707	
Extraversion x Neuroticism	4	29.8090	44.4446	91.6488		4	67.0872	16.7718	3.0158	5%
Sex x Extraversion x Neuroticism	4	31.7804	22.7421	32.1112		4	21.1337	5.2834	.9500	
Error	216	13715.9804	4209.1473	15534.3825		215	1195.1473	5.5613		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 150.1402 1.8161

198 1045.5483

Significance of differences between means :

Attainment Tests. Reading. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 52.77		.43	2.97	R_3	.7968	1.0330
B 52.33			2.54	R_2	.7574	1.0073
C 49.80				df =	77.88	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attainment Tests. Reading. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : LN ME	B : HN HE	C : LN HE	D : MN HE	E : MN LE	F : HN LE	G : MN ME	H : HN ME	I : LN LE	Shortest Significant Ranges	5%	1%
A 56.71		2.94	4.07	4.48	5.26	5.78	5.81	6.03	10.04	R_9	1.5859	2.1252
B 53.77			1.14	1.55	2.32	2.85	2.88	3.09	7.11	R_8	1.5741	2.1082
C 52.64				.41	1.18	1.71	1.74	1.96	5.97	R_7	1.5600	2.0880
D 52.23					.77	1.30	1.33	1.54	5.56	R_6	1.5416	2.0640
E 41.45						.53	.56	.77	4.79	R_5	1.5181	2.0339
F 50.93							.03	.25	4.26	R_4	1.4870	1.9948
G 50.90								.22	4.23	R_3	1.4428	1.9416
H 50.68									4.01	R_2	1.3736	1.8616
I 46.67										df = 24.91		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Number. 9+.

Srouce	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	17.2089	10.2569	6.1133		1	1.2972	1.2972	.4480	
Extraversion	2	33.2969	42.0867	56.4439		2	33.7752	16.3876	5.6589	1%
Neuroticism	2	4.2090	10.4157	32.3815		2	26.1176	13.0588	4.5094	5%
Sex x Extraversion	2	19.2288	3.3534	5.4326		2	5.2624	2.6312	.9086	
Sex x Neuroticism	2	3.4173	.4342	.5461	.3213	2	.6199	.3099	.1070	
Extraversion x Neuroticism	4	18.7095	19.9423	35.5457		4	24.6499	6.1625	2.1280	
Sex x Extraversion x Neuroticism	4	69.2920	26.3591	18.9090		4	9.1228	2.2807	.7876	
Error	216	16370.7095	5260.1829	9106.6957		215	628.6240	2.8959		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	114.3089		2.8440	
						198	508.3152			

Significance of differences between means :

Attainment Tests. Number. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A 41.86		1.41	3.45	R_3	.5750	.7454
B 40.45			2.03	R_2	.5466	.7268
C 38.41				df =	77.76	

Means	A : LN	B : MN	C : HN	Shortest Significant Ranges	5%	1%
A 41.55		1.06	2.91	R_3	.5750	.7454
B 40.49			1.84	R_2	.5466	.7268
C 38.65				df =	77.78	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 10+. Data y. Attainment Tests. Number. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.7980	1.9582	4.8050		1	3.3250	3.3250	1.2563	
Extraversion	2	122.5887	94.1978	73.4993		2	16.5464	8.2732	3.1260	5%
Neuroticism	2	8.8568	12.2627	27.7315		2	19.1241	9.5620	3.6130	5%
Sex x Extraversion	2	16.3111	6.3656	2.9503		2	.4738	.2369	.0895	
Sex x Neuroticism	2	4.8152	-1.1176	1.7472	.4121	2	3.4851	1.7425	.6584	
Extraversion x Neuroticism	4	29.8090	29.6965	31.0866		4	11.6527	2.9132	1.1007	
Sex x Extraversion x Neuroticism	4	31.7804	20.6898	15.2801		4	3.6212	.9052	.3421	
Error	216	13715.9804	5651.7210	9106.6957		215	569.0105	2.6466		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	67.6956		1.7078	
						198	501.3150			

Significance of differences between means :

Attainment Tests. Number. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A 38.94		.73	2.18	R_3	.5497	.7126
B 38.21			1.45	R_2	.5225	.6949
C 36.76				df =	77.88	

Means	A : LN	B : MN	C : HN		Shortest Significant Ranges 5%	1%
A 39.33		1.67	2.36	R_3	.5497	.7126
B 37.66			.69	R_2	.5225	.6949
C 36.96				df =	77.86	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Comp/Vocab. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	17.2089	-2.3564	.3227		1	5.0895	5.0895	1.4021	
Extraversion	2	33.2969	52.9969	91.1930		2	53.4600	26.7300	7.3638	1%
Neuroticism	2	4.2090	4.2449	4.2852		2	1.5258	.7629	.2102	
Sex x Extraversion	2	19.2288	6.9934	4.5220		2	2.0149	1.0074	.2775	
Sex x Neuroticism	2	3.4173	.6186	7.3128	.4072	2	7.3756	3.6878	1.0159	
Extraversion x Neuroticism	4	18.7095	17.6280	42.7619		4	31.5022	15.7511	4.3393	1%
Sex x Extraversion x Neuroticism	4	69.2920	39.0318	25.4647		4	5.1599	1.2900	.3554	
Error	216	16370.7095	6665.8405	12010.5070		215	780.4347	3.6299		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	57.6248		1.0083	
						198	722.8099			

Significance of differences between means :

Attainment Tests. Comp/Vocab. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HE	B : ME	C : LE		Shortest significant Ranges 5%	1%
A 48.51		1.41	3.74	R_3	.6437	.8345
B 47.10			2.33	R_2	.6119	.8138
C 44.77				df =	77.76	

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attainment Tests. Comp/Vocab. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HN HE	B : LN ME	C : MN HE	D : LN HE	E : HN ME	F : MN LE	G : MN ME	H : HN LE	I : LN LE	Shortest Significant Ranges	5%	1%
A 50.12		.02	2.10	2.15	2.73	3.65	4.21	6.02	6.42	R_9	1.2812	1.7169
B 50.10			2.08	2.14	2.72	3.63	4.20	6.01	6.41	R_8	1.2717	1.7032
C 48.02				.05	.63	1.55	2.11	3.92	4.33	R_7	1.2603	1.6869
D 47.97					.58	1.49	2.06	3.87	4.27	R_6	1.2455	1.6675
E 47.39						.91	1.48	3.29	3.69	R_5	1.2265	1.6432
F 46.47							.57	2.38	2.78	R_4	1.2014	1.6116
G 45.91								1.81	2.21	R_3	1.1657	1.5686
H 44.10									.40	R_2	1.1098	1.5040
I 43.70										df = 25.22		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 10+. Data y. Attainment Tests. Comp/Vocab. 10+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.7980	-2.7583	9.5339		1	11.8627	11.8627	2.4631	
Extraversion	2	122.5887	124.7024	134.6381		2	54.1953	27.0977	5.6265	1%
Neuroticism	2	8.8568	.8978	3.2022		2	3.8964	1.9482	.4045	
Sex x Extraversion	2	16.3111	13.2598	16.0167		2	8.0260	4.0130	.8332	
					.3992					
Sex x Neuroticism	2	4.8152	4.4500	19.5574		2	16.7714	8.3857	1.7412	
Extraversion x Neuroticism	4	29.8090	48.2097	88.1373		4	54.3005	13.5751	2.8187	5%
Sex x Extraversion x Neuroticism	4	31.7804	21.5545	36.8963		4	24.7458	6.1865	1.2845	
Error	216	13715.9804	5475.5463	14520.0118		215	1035.4629	4.8161		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 82.2053 1.0906

198 953.2576

232

Significance of differences between means :

Attainment Tests. Comp/Vocab. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : HE	B : ME	C : LE		Shortest Significant Ranges 5%	1%
A	50.35		.93	3.61	R_3	.7415	.9613
B	49.42			2.68	R_2	.7049	.9373
C	46.74				df = 77.88		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Significance of differences between means :

Attainment Tests. Comp/Vocab. Adjusted for differences in Spatial Reasoning. Age 10+.

Means	A : LN ME	B : HN HE	C : LN HE	D : MN HE	E : MN LE	F : HN ME	G : MN ME	H : HN LE	I : LN LE	Shortest Significant Ranges	5%	1%
A 53.27		.72	3.03	4.26	4.47	5.13	5.27	6.12	9.23	R_9	1.4758	1.9777
B 52.55			2.31	3.54	3.75	4.41	4.55	5.40	8.51	R_8	1.4648	1.9619
C 50.24				1.23	1.43	2.10	2.24	3.09	6.20	R_7	1.4517	1.9431
D 49.01					.21	.87	1.02	1.86	4.97	R_6	1.4346	1.9207
E 48.80						.66	.81	1.66	4.76	R_5	1.4127	1.8927
F 48.14							.15	.99	4.10	R_4	1.3838	1.8564
G 47.99								.85	3.95	R_3	1.3427	1.8069
H 47.15									3.11	R_2	1.2783	1.7324
I 44.04										df = 24.91		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 9+. Data y. Attainment Tests. Numerical Problems. 9+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	17.2089	20.7289	24.9689		1	12.9039	12.9039	4.2762	1%
Extraversion	2	33.2969	41.6387	52.9860		2	28.5764	14.2882	4.7350	1%
Neuroticism	2	4.2090	8.1871	22.6934		2	17.6349	8.8174	2.9220	
Sex x Extraversion	2	19.2288	-4.0873	1.0161		2	5.9724	2.9862	.9896	
Sex x Neuroticism	2	3.4173	.9979	1.6615	.3382	2	1.3774	.6887	.2282	
Extraversion x Neuroticism	4	18.7095	18.9944	29.8758		4	19.1593	4.7898	1.5873	
Sex x Extraversion x Neuroticism	4	69.2920	18.7791	5.5107		4	.7324	.1831	.0607	
Error	216	16370.7095	5535.8715	9600.0941		215	648.7823	3.0176		
Total	233					232				

Harmonic Mean Group n = 11.9117 Homogeneity of Covariance : Between Cells 17 45.3371 .9502

198 603.4452

Significance of differences between means :

Attainment Tests. Numerical Problems. Adjusted for differences in Spatial Reasoning. Age 9+.

Means	A : HE	B : ME	C : LE	Shortest Significant Ranges	5%	1%
A 43.61		1.16	3.24	R_3	.5869	.7609
B 42.45			2.08	R_2	.5580	.7420
C 40.37				df = 77.76		

Means underscored by the same line are not significantly different.

Means not underscored by the same line are significantly different.

Unweighted Means Analysis of Covariance of Extraversion x Neuroticism x Sex

Data x. Attainment Tests. Spatial Reasoning. 10+. Data y. Attainment Tests. Numerical Problems. L0+.

Source	df	Sum Squares x	Sum Products	Sum Squares y	Regression	df	Sum Squares y	Mean Square y	'F'	Sig.
Sex	1	.7980	-2.5077	7.8805		1	10.9649	10.9649	4.3358	5%
Extraversion	2	122.5887	101.8369	85.7797		2	9.7977	4.8988	1.9371	
Neuroticism	2	8.8568	10.1660	23.0287		2	14.3724	7.1862	2.8416	
Sex x Extraversion	2	16.3111	7.8637	9.7866		2	6.1059	3.0529	1.2072	
					.5644					
Sex x Neuroticism	2	4.8152	-2.4074	1.5307		2	5.7804	2.8902	1.1429	
Extraversion x Neuroticism	4	29.8090	21.9274	19.7392		4	4.4809	1.1202	.4430	
Sex x Extraversion x Neuroticism	4	31.7804	14.1515	9.4165		4	3.5650	.8913	.3524	
Error	216	13715.9804	7741.6872	10846.2689		215	543.7210	2.5289		
Total	233					232				
Harmonic Mean Group n = 11.9117				Homogeneity of Covariance : Between Cells		17	292.4426		14.7189	1%
						198	251.2785			

Analysis of Linearity of Regression. Attainments on Extraversion. Age 8+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	175.9702	2.3575
	Deviation	1	52.3114	.7008
	Within	231	74.6427	
Reading	Linear	1	65.1078	.7234
	Deviation	1	153.1390	1.7016
	Within	231	89.9983	
Number	Linear	1	298.7672	8.2884
	Deviation	1	22.2408	.6170
	Within	231	36.0466	
Comp/Vocab.	Linear	1	364.4346	5.2563
	Deviation	1	.3450	.0050
	Within	231	69.3334	

Analysis of Linearity of Regression. Attainments on Extraversion. Age 8+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	369.7855	4.6819
	Deviation	1	.4938	.0063
	Within	231	78.9812	
Numerical Problem Solving	Linear	1	343.7910	5.5010
	Deviation	1	108.9962	1.7441
	Within	231	62.4958	

Analysis of Linearity of Regression. Attainments on Extraversion. Age 9+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	1457.6173	17.2206
	Deviation	1	26.5639	.3138
	Within	231	84.6438	
Reading	Linear	1	996.6086	10.5740
	Deviation	1	261.0805	2.7728
	Within	231	94.1561	
Number	Linear	1	624.3780	11.0200
	Deviation	1	47.9648	.8466
	Within	231	56.6587	
Comp/Vocab.	Linear	1	1072.2937	18.3065
	Deviation	1	58.9700	1.0508
	Within	231	56.1164	

Analysis of Linearity of Regression. Attainments on Extraversion. Age 9+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	640.9171	1.6298
	Deviation	1	54.2962	.1381
	Within	231	393.2370	
Numerical Problem Solving	Linear	1	543.9955	11.8520
	Deviation	1	87.1578	1.8989
	Within	231	45.8990	
Spatial Reasoning	Linear	1	301.2235	3.9635
	Deviation	1	95.3992	1.2553
	Within	231	76.0001	

Analysis of Linearity of Regression. Attainments on Extraversion. Age 10+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	332.9859	5.2613
	Deviation	1	92.5990	1.4631
	Within	231	63.2902	
Reading	Linear	1	474.7795	6.1263
	Deviation	1	310.7595	4.0098
	Within	231	77.4992	
Number	Linear	1	288.9103	6.2597
	Deviation	1	70.4349	1.5261
	Within	231	46.1542	
Comp/Vocab.	Linear	1	801.0177	10.5995
	Deviation	1	30.4274	.4026
	Within	231	75.5710	

Analysis of Linearity of Regression. Attainments on Extraversion. Age 10+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	883.4491	13.8527
	Deviation	1	2.8247	.0443
	Within	231	63.7744	
Numerical Problem Solving	Linear	1	445.5958	9.8025
	Deviation	1	12.2514	.2695
	Within	231	45.4572	
Spatial Reasoning	Linear	1	879.8844	13.1320
	Deviation	1	24.7317	.3691
	Within	231	67.0029	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 8+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	41.1299	.5486
	Deviation	1	111.6153	1.4888
	Within	231	74.9697	
Reading	Linear	1	80.0425	.8835
	Deviation	1	.8598	.0095
	Within	231	90.5928	
Number	Linear	1	1.4325	.0384
	Deviation	1	35.3162	.9474
	Within	231	37.2772	
Comp/Vocab.	Linear	1	132.9387	1.8968
	Deviation	1	58.3040	.8319
	Within	231	70.0846	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 8+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	11.1641	.1386
	Deviation	1	.3115	.0079
	Within	231	80.5345	
Numerical Problem Solving	Linear	1	5.5877	.0867
	Deviation	1	.3919	.0061
	Within	231	64.4300	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 9+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	2.2934	.0253
	Deviation	1	111.0512	1.2260
	Within	231	90.5782	
Reading	Linear	1	.1286	.0013
	Deviation	1	.0893	.0009
	Within	231	99.5953	
Number	Linear	1	385.6255	6.6603
	Deviation	1	.0932	.0016
	Within	231	57.8995	
Comp/Vocab.	Linear	1	38.6511	.6378
	Deviation	1	12.3929	.2045
	Within	231	60.5979	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 9+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	153.8619	.3890
	Deviation	1	5.7536	.0145
	Within	231	395.5556	
Numerical Problem Solving	Linear	1	267.9586	5.6459
	Deviation	1	2.3584	.0497
	Within	231	47.4610	
Spatial Reasoning	Linear	1	39.2730	.5067
	Deviation	1	10.8634	.1402
	Within	231	77.5001	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 10+.

Test	Source	df	SS/MS	F
Spelling	Linear	1	30.1662	.4646
	Deviation	1	15.9297	.2453
	Within	231	64.9330	
Reading	Linear	1	8.0158	.1000
	Deviation	1	164.5700	2.0532
	Within	231	80.1526	
Number	Linear	1	9.8681	.2081
	Deviation	1	55.8624	1.1779
	Within	231	47.4252	
Comp/Vocab.	Linear	1	36.7554	.4682
	Deviation	1	116.6642	1.4861
	Within	231	78.5062	

Analysis of Linearity of Regression. Attainments on Neuroticism. Age 10+.

Test	Source	df	SS/MS	F
Verbal Reasoning	Linear	1	12.2606	.1818
	Deviation	1	25.6010	.3796
	Within	231	67.4472	
Numerical Problem Solving	Linear	1	33.5532	.7119
	Deviation	1	37.4151	.7938
	Within	231	47.1320	
Spatial Reasoning	Linear	1	18.4201	.2608
	Deviation	1	50.7202	.7182
	Within	231	70.6196	

Contingency Tables.

High/Low Attainment - High/Low Extraversion

Schools A, D and E.

Extraversion		Attainment. A			D			E		
		Low	High	χ^2	Low	High	χ^2	Low	High	χ^2
Spelling	8+	16 15	15 14	0.00	5 11	10 11	1.01	30	35	7.47
	9+	16 13	18 13	0.76	3 11	9 14	0.58	23 42	38 17	13.55
	10+	14 13	17 16	0.05	6 13	7 11	0.22	18 39	37 26	8.58
Reading	8+	14 17	13 16	0.00	10 6	12 9	0.11	30 39	28 23	1.53
	9+	18 11	17 14	0.32	5 9	11 12	0.51	25 40	33 42	5.54
	10+	12 15	20 13	1.69	8 11	9 19	0.23	23 34	37 26	4.04
Number	8+	21 10	23 6	1.02	2 14	12 9	5.90	25 44	29 22	5.04
	9+	19 10	25 6	2.09	4 10	10 13	0.74	22 43	27 28	2.96
	10+	15 12	20 13	0.47	7 12	7 11	0.53	19 38	32 31	3.73
Comp/Vocabulary	8+	18 13	18 11	0.10	4 12	12 9	2.63	24 45	23 28	1.32
	9+	19 10	21 10	0.03	2 12	16 7	8.61	23 42	30 25	4.44

		A			D			E		
		Low	High	χ^2	Low	High	χ^2	Low	High	χ^2
Verbal Reasoning	8+	17 14	11 18	1.72	8 8	11 10	0.02	24 45	28 23	4.84
	9+	16 13	18 13	0.05	3 9	11 12	0.52	22 43	31 24	6.13
	10+	14 13	19 14	0.20	5 14	14 4	7.86	18 39	36 27	7.90
Numerical Problems	8+	19 12	18 11	0.00	3 13	11 10	3.05	28 41	30 21	3.91
	9+	18 11	21 10	0.21	4 10	8 15	0.22	16 49	26 29	6.72
	10+	10 17	21 12	4.21	6 13	9 9	1.30	11 46	26 37	6.77
Spatial Reasoning	8+		-		-			-		
	9+	20 9	22 9	0.29	7 7	14 9	0.33	17 48	26 29	5.78
	10+	15 12	17 16	0.97	7 12	12 6	3.30	13 44	30 33	8.00